NIH Program Evaluation Report

An Analysis of Research Publications Supported by NIH 1973-1980

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NIH Program Evaluation Report

AN ANALYSIS OF RESEARCH PUBLICATIONS SUPPORTED BY NIH 1973-76 and 1977-80

National Institutes of Health
and
NIH Intramural Program

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ANALYSIS OF PUBLICATIONS ON NIH-SUPPORTED RESEARCH 1973-76 and 1977-80

NIH--All Institutes Combined and the Intramural Program

INTRODUCTION: THE BID-MEDLINE PUBLICATION DATA SET

This report presents an analytic characterization of the 1973-80 biomedical research publications supported by the National Institutes of Health. Part I describes NIH publications for the intramural and extramural research programs combined; Part II focuses on intramural research publications only. Parallel analyses have been conducted for each of the Bureaus, Institutes, and Divisions (BIDs), and a report on each Institute is available.

Since 1973, CHI Research, the research group at Computer Horizons, Inc., has worked under contract to NIH (contracts N01-OD-3-2109 and N01-OD-1-2109) on the development and application of indicators of biomedical research activity. The present reports are a product of this collaborative association.

These reports supersede the previous set of bibliometric evaluation reports covering the period 1970-76 (11). It should be noted that the first set contained no report for the total NIH--all Institutes combined--or for the intramural research program. The reader should also be aware that the reports for the individual Institutes from these two sets are not strictly comparable. Partly because of changes in MEDLINE journal coverage, and partly because the Institute for Scientific Information has shifted most behavioral science journals from the Science Citation Index (SCI) to the Social Science Citation Index, the present set of reports is limited to coverage of clinical medicine and biomedical research. Chemistry and psychology, which were covered in the previous set of reports, are not included in the computer-generated data of this set. Paper counts obtained manually, however, were used in certain calculations, as noted below.

The present set provides a comparative analysis of the papers published in a selected group of 240 biomedical journals for two time frames--1973-76 and 1977-80. The 240-journal set contains, overall, about 75 percent of the NIH-supported research papers published during this period. These 240 journals are designated as the "BID-MEDLINE journal set." Limitation of the analysis to this subset of journals was due to the necessity of examining each paper individually to determine sources of support. Beginning, however, with the publication year 1981, inclusion of data on support acknowledgement in the National Library of Medicine's MEDLINE system, which covers about 2,000 biomedical journals, has made possible more extended and refined analyses.

Journal Selection

The information contained here is drawn from an analysis of some 460,000 papers published between 1973 and 1980 in 240 biomedical research journals. The publications attributed to a given Institute report on both intramural and extramural (grant- and contract-supported) research.

The need to examine each paper for acknowledgement of support dictated restriction of the study to a limited number of journals. The initial selection aimed at:

- Representing all biomedical research areas by their most influential (most often cited) journals, and

- Covering as many of the papers supported by NIH as possible.

Through selection of the most influential journals and those that maximize coverage of NIH-supported papers, the role of NIH in bioscience publication is somewhat magnified. Future reports, which will be based on all MEDLINE/SCI-covered journals, will include many in which NIH-supported authors publish less frequently. The NIH presence in these collective fields and subfields will be smaller.

Previous reports on these bibliometric studies were based on papers in 275 journals covered by the SCI. During the evolution of the present project, it was decided to merge the set with the MEDLINE data base of the National Library of Medicine. This resulted in a more limited data set, for the process of merging excluded journals not common to the two component systems. The new "BID-MEDLINE journal set contains 240 journals.

These are listed by subfield in Appendix C. Because MEDLINE has limited its coverage of Chemistry in recent years, and neither SCI nor MEDLINE offers more than minimal coverage of the behavioral sciences, these two fields are underrepresented in the present studies.

Data Capture

Development of the BID-MEDLINE data set required that every paper published in the original 275 journals between 1970 and 1980 be scanned to capture acknowledgements of BID support. Up to three acknowledgements are tabulated and added to the original listings drawn from the SCI. When more than one source of support is acknowledged, fractional credits are assigned. For example, a paper acknowledging both NCI and NIAID is counted as one-half paper for each Institute. The resulting lists are then matched to SCI corporate tapes to obtain author institutional affiliations. Up to three affiliations are entered in the data set.

The final step in the development of the 240-journal data base requires matching the papers in the 275 SCI journals to the MEDLINE data base. This match provides titles of the papers, names of all authors, and medical subject headings (MeSH: index terms). The product of this match constitutes the 240-journal BID-MEDLINE data base, 1970-80.

Representativeness of the Data

Adequacy of coverage of the original 275-journal set was assessed principally by comparing the number of BID-supported papers found in these journals with the numbers reported in the 1973 NIH Research Grants Index and the NIH Directory-Bibliography. In making these comparisons, books, abstracts, and other inappropriate (for this purpose) items were not counted. Overall, the selected group of 275 journals contained approximately 80 percent of all NIH-supported papers.

The adequacy of the journal set was also assessed by correlating the number of papers in each biomedical subfield in the BID set with the number of U.S. papers in the same subfields in the over 900 biomedical journals in the Science Citation Index (SCI). Correlation of the two sets was .98.

NIH Support of Research in Chemistry and Psychology

Although the unavailability of Chemistry papers in MEDLINE and of most Psychology papers in both SCI and MEDLINE precludes coverage of these fields in the computer-generated tables in this report, some data are available. For the field of Chemistry, information on source of support has been obtained manually for the entire report period, 1973-76 and 1977-80. Psychology data are available through 1976. These data have been used in correlating Institute funding with research publications.

Table 1 shows the number and percent of each BID's supported papers in the original 275-BID-journal set for (a) Chemistry for the periods 1973-76 and 1977-80 and (b) Psychology for 1970-76.

Obviously, the loss of coverage of the field of Chemistry has an important effect on the adequacy with which the publication performance of NIGMS can be described. With 12 percent of the Institute's publications omitted, all such statistics as the activity index, percent of internal effort, and citation rates are somewhat distorted. While the effects on NCI and NIADDK data are substantial, their summary statistics should not be significantly affected.

Similarly, the loss of coverage of the Psychology literature deprives NICHD of important program information and significantly affects other NICHD publication statistics. Although we have no data after 1976 on reports of psychological research, we can assume that at least NICHD and NIA performance records are underrepresented in the present data sets.

Journal Coverage

One of the limitations of basing analyses on a fixed set of journals is the possibility that substantive growth of a discipline may result in

Table 1

NUMBER AND PERCENT OF NIH-SUPPORTED PAPERS ON CHEMISTRY (1973-76 AND 1977-80) AND PSYCHOLOGY (1970-76) IN 275 JOURNALS

	Chemistry				Psychology	
	1973-76		1977-80		1970-76	
	Number	Percent*	Number	Percent*	Number	Percent*
NCI	809	6.6%	1,031	7.0%	6	0.1%
NEI	17	0.9	21	0.9	89	3.1
NHLBI	197	2.1	244	2.3	33	0.2
NIA**	0	0.0	5	1.2	5	7.6
NIADDK	378	3.9	284	3.0	35	0.2
NIAID	101	1.7	118	2.2	4	0.1
NICHD	56	1.1	42	0.9	1,075	12.7
NIDR	30	2.0	30	2.2	23	0.9
NIEHS	Not determined		Not determined		Not determined	
NIGMS	1,031	10.9	1,191	12.2	117	0.7
NINCDS	91	1.6	59	1.1	416	4.1

---

*Percent of Institute's papers that are in this field.
**NIA-supported papers first appeared in 1975.

substantial change in journal utilization. For example, new journals may draw off many authors in a rapidly growing specialty area. Such changes can be expected to affect BID records differentially and cannot be measured with a fixed set of journals.

A special study (13) was made during the past year to assess the significance of this kind of problem. Two subfields, Endocrinology and Immunology, were selected for study. They were chosen for different reasons and were expected to produce different results. Immunology was selected because it was thought to be a candidate for rapid advance in new directions that might result in new journals and changing patterns of journal utilization. Endocrinology was selected because it was perceived as not having changed dramatically in types of research activity in recent years, and hence as not likely to exhibit marked changes in publication patterns.

All 1975 and 1980 papers in SCI-covered journals in the two subfields were manually examined for research support acknowledgements. The results were compared with the figures obtained from the corresponding subfields in the 240 BID-MEDLINE journal set. (The 240 journal set covers 7 of 24 SCI-covered Endocrinology journals and 9 of 36 SCI-covered Immunology journals.) Results for the two subfields contrast sharply.

Percent of NIH-Supported Papers in
Two Subfields of the BID-MEDLINE 240-Journal Set

	Endocrinology	Immunology
1975	81.1	65.9
1980	82.2	58.5

Although the 7 Endocrinology journals in the 240-journal set include only 56 percent of all Endocrinology papers, they publish over 80 percent of NIH-supported papers in this field. For almost all BIDs, these 7 journals captured 80 to 87 percent of the acknowledgements of NIH research support in both 1975 and 1980. Only NHLBI Endocrinology research is less well captured (70 percent in 1975 and 64 percent in 1980). Overall, it is apparent that reports based on the 240-journal set provide accurate intra-NIH comparison information but overestimate the role of NIH in national or international comparisons.

With respect to Immunology, however, our concerns about extent of coverage proved well founded. The extensions of this field are not well reflected in the 9 Immunology journals in our 240-journal set. For example, while NCI-supported investigators produced 57 percent more Immunology papers in 1980 than in 1975, the 240-journal set shows only a 39 percent increase. NIAID investigators produced 12 percent more Immunology papers in 1980, but the 240-journal set shows nearly a 1 percent reduction in the number of supported papers.

Overall, the Immunology journals in our set captured 66 percent of NIH-supported research in 1975, but only 58.5 percent of the NIH papers published in 1980. While 70 percent of NIADDK-supported papers appeared in the 9 journals in 1980, only 56 percent of NHLBI and 58 percent of NIAID-supported papers appeared there. Data on Immunology publication must therefore be interpreted cautiously.

Citation Frequency

The number of times each paper in the data set was cited has been added to the data base, utilizing the SCI citation tapes for 1973 to 1980. In the citation matching, BID and institutional identifications as well as MEDLINE data have been retained for both references and citations.

Field Coverage

CHI Research has assigned all SCI-covered journals to one of nine major fields of science:

Clinical Medicine	(1)
Biomedical Research	(2)
Biology	(3)
Chemistry	(4)
Physics	(5)
Earth & Space Science	(6)
Engineering & Technology	(7)
Psychology	(8)
Mathematics	(9)

Since the 240 BID-MEDLINE journals primarily publish reports of clinical medicine and biomedical research (Fields 1 and 2), the following analyses are restricted to these two areas. Ninety-four percent of the papers in these journals are in the two fields.

Subject and Level Classification

A journal classification system has been developed in which each biomedical journal is assigned to 1 of 46 biomedical subfields.* The 46 subfields are also collectively grouped into clinical medicine or biomedical (basic) research. The journal classification thus permits characterization of each BID's research support activity into journal-defined traditional disciplines, such as Physiology, Microbiology, Immunology, and Pathology. These subfields are listed in Table 2.

Journals have also been assigned to a "research level." The level concept assumes the existence of a scale ranging from clinical observation (Level 1) to basic science (Level 4) journals. The level designations and a "prototype journal" for each level are as follows:

Level 1 - Clinical Observation. Prototype: *Journal of the American Medical Association*

Level 2 - Clinical Mix. Prototype: *New England Journal of Medicine*

Level 3 - Clinical Investigation. Prototype: *Journal of Clinical Investigation*

Level 4 - Basic Research. Prototype: *Journal of Biological Chemistry*

Classification by level affords a useful perspective for consideration of BID programs. The classification system is described in greater detail in references 1 and 2. Additional clarification of the concept may be obtained by reviewing the level assignment of each of the journals in the 240-journal set (Appendix C).

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*A few multidisciplinary journals (e.g., *Science*, *Nature*, *Proc. Nat. Acad. Sci.*) have been split--i.e., fractionally assigned to more than one subfield.

Table 2

Field and Subfield Classification of Publications

Clinical Medicine

General & Internal Medicine
Allergy
Anesthesiology
Cancer
Cardiovascular System
Dentistry
Dermatology & Venereal Diseases
Endocrinology
Fertility
Gastroenterology
Geriatrics
Hematology
Immunology
Obstetrics & Gynecology
Neurology & Neurosurgery
Ophthalmology
Orthopedics
Arthritis & Rheumatism
Otorhinolaryngology
Pathology
Pediatrics
Pharmacology
Pharmacy
Psychiatry
Radiology & Nuclear Medicine
Respiratory System
Surgery
Tropical Medicine
Urology
Nephrology
Veterinary Medicine
Hygiene & Public Health

Biomedical Research

Physiology
Anatomy & Morphology
Embryology
Genetics & Heredity
Nutrition & Dietetics
Biochemistry & Molecular Biology
Biophysics
Cell Biology, Cytology & Histology
Microbiology
Virology
Parasitology
Biomedical Engineering
Miscellaneous Biomedical Research
General Biomedical Research

PART I. TOTAL NIH

NIH FUNDING AND PUBLICATION TRENDS

Figures 1 through 5 summarize trends in funding and publication for NIH overall, for each of the Institutes, and for the entire BID-MEDLINE data base.

Figure 1 depicts NIH obligations from 1965 through 1980, in constant (1969) dollars.* Between 1970 and 1980, total NIH obligations in constant dollars increased by 62 percent.

Figure 2 shows all NIH papers, Fields 1-9 in the BID-MEDLINE data set for 1970 through 1980. Also shown are the remaining U.S.-authored and -supported papers in this data set. Between 1970 and 1980 the total NIH-supported papers increased 30 percent, while Other U.S. declined 13 percent (1973-80). Over the decade, total BID-MEDLINE papers increased 40 percent. Data for 1970-72 U.S. and U.S.-supported papers are not available, so the corresponding change cannot be determined.

Figure 3 summarizes the changes in sources of support for the BID-MEDLINE papers, Fields 1 and 2, between two periods, 1973-76 and 1977-80. The most notable changes are the relatively large increase in the foreign papers,** from 29.6 percent of all the BID-MEDLINE papers (Fields 1 and 2) in 1973-76 to 32.9 percent in 1977-80, and the increase from 20.5 to 23.1 in the percent of U.S. papers that acknowledged no support. Although the percent of NIH-supported papers decreased from 29.1 to 28.0, the number of such papers increased.

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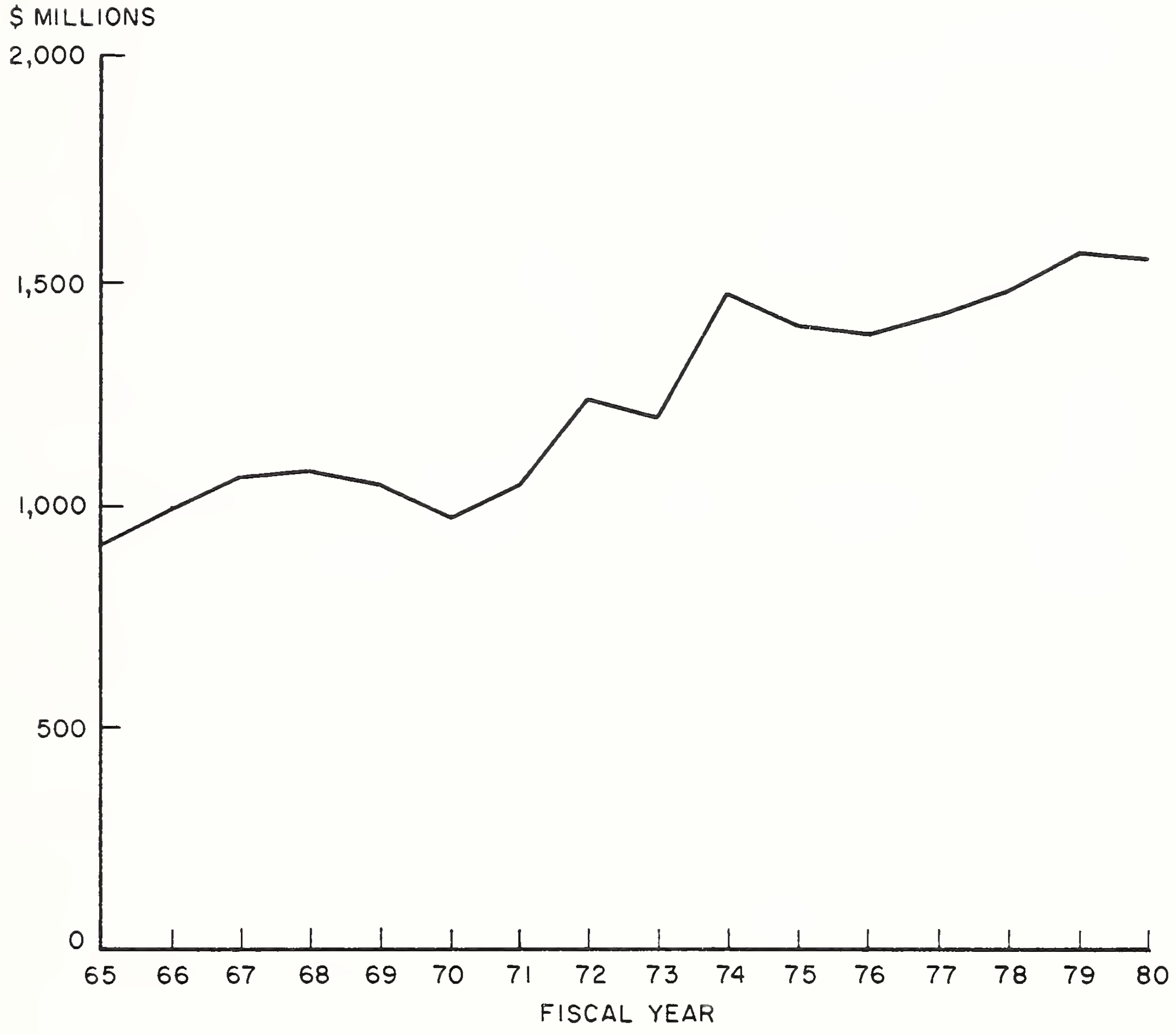
*Constant dollar estimates based on NIH Biomedical R&D Price Index.

**Foreign papers are those with foreign institutional authors who are not supported by a U.S. agency. For example, a French scientist's paper acknowledging support from NCI is counted as an NCI-supported paper, not as a foreign paper.

Figure 1

NIH OBLIGATIONS, FISCAL YEARS 1965-1980, IN CONSTANT (1969) DOLLARS*



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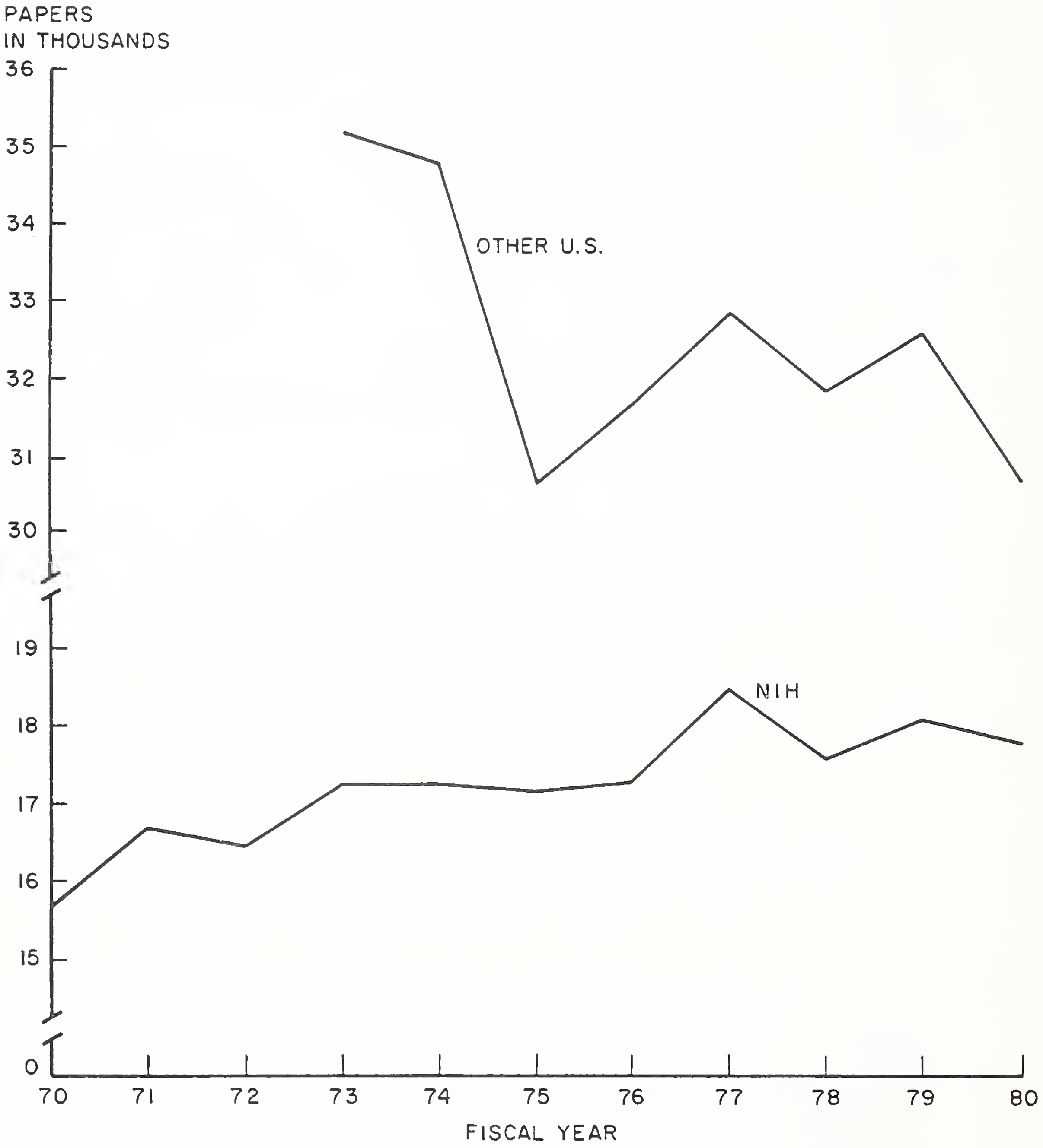
*1965-68 data from "Basic Data Relating to the National Institutes of Health, 1976," p. 15. 1969-80 data from "Basic Data Relating to the National Institutes of Health, 1981," p. 11. NIH Publication No. 81-1261, May 1981. Excludes FIC, NLM, OD, Buildings and Facilities, HRF construction grants, and programs that have been transferred out of NIH. Biomedical Price Index was used to adjust current to constant dollars.

Figure 2

NIH-SUPPORTED AND ALL OTHER U.S.-SUPPORTED PAPERS
BID-SCI JOURNAL SET, FIELDS 1-9, 1970-80*



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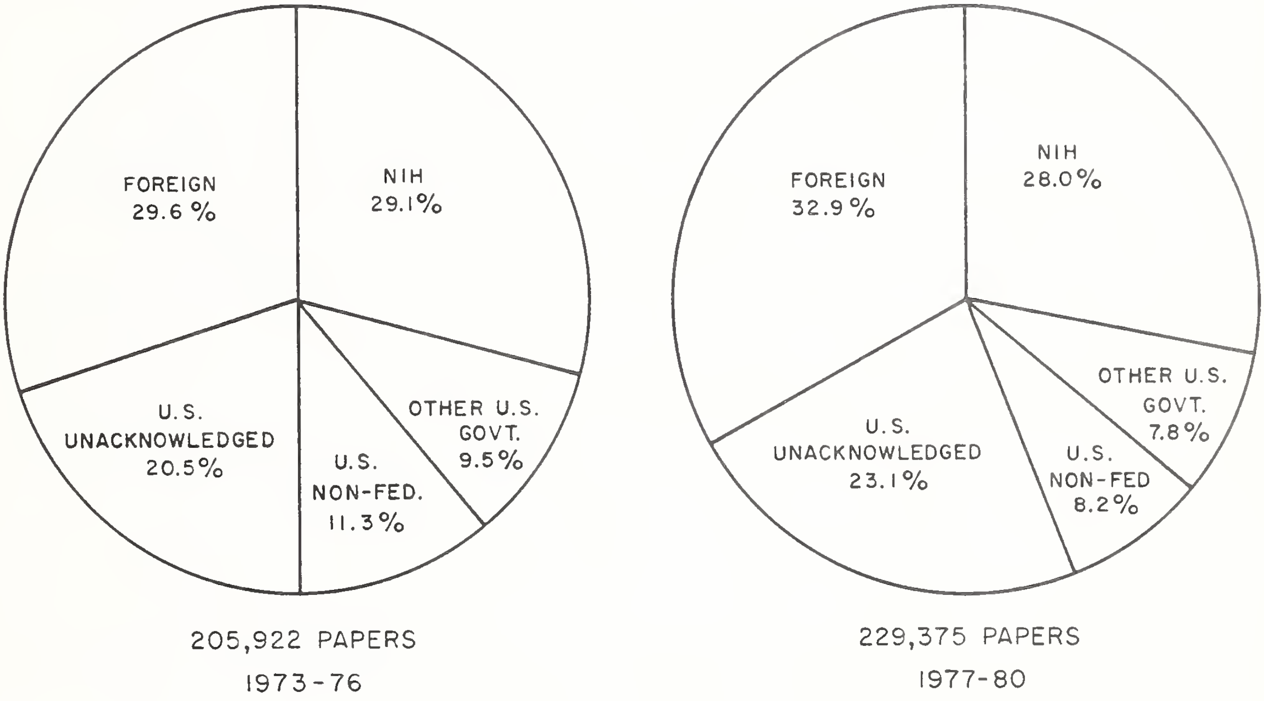
*Data not available on all U.S.-authored and -supported papers for 1970-72.

Figure 3

PERCENT DISTRIBUTION OF BIOMEDICAL RESEARCH PUBLICATIONS BY SOURCE OF SUPPORT, 1973-76 AND 1977-80 (BIO-MEDLINE FIELDS 1 AND 2)



Figures 4 and 5 permit comparison of overall trends in funding and publication for the NIH BIDs covered in this series of evaluation reports.

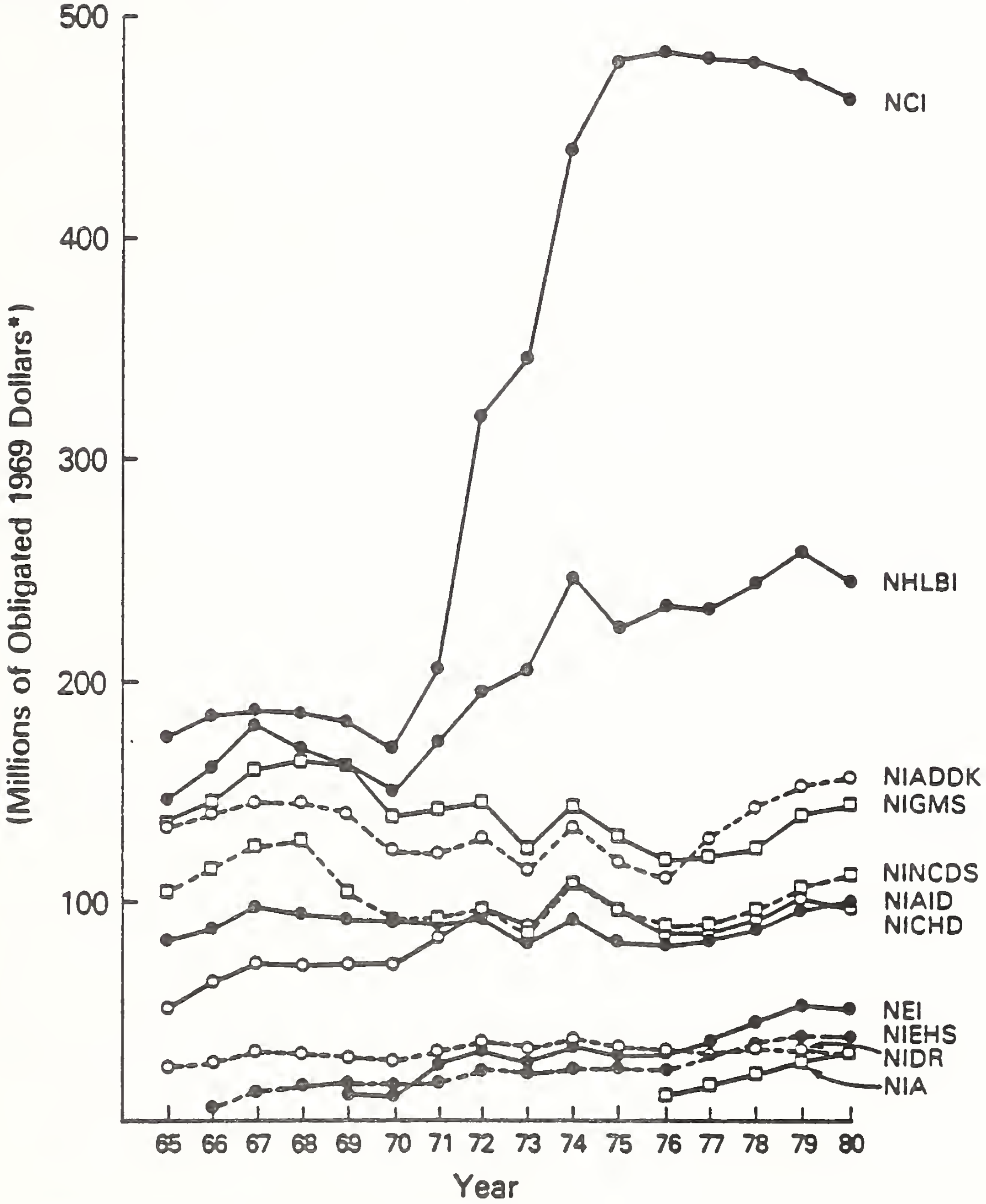
Figure 4 depicts total obligations for each BID, from 1965 through 1980, in 1969 dollars. Between 1970 and 1976, changes in constant-dollar obligations fluctuated for most BIDs. NCI and NHLBI obligations increased greatly; increases were smaller but consistent for NEI and NIEHS. Some BIDs actually declined in financial strength over this period. Between 1976 and 1980, however, obligations in constant dollars increased moderately for all BIDs except NCI and NIDR.

Figure 5 shows corresponding publication trends for the NIH BIDs from 1970 through 1980. Close relations between publications and funding are clearly depicted in the large increase in annual publication rates for NCI and NHLBI and in the manner in which most BIDs range below them. NIADDK and NIGMS appear to be the exceptions. They seem to support a great many more publications than would be expected, given their sizes. The apparent discrepancy occurs because these two institutes support proportionally more basic science research than do other BIDs, and basic scientists on average publish many more papers than do clinicians.

Data are not available to permit discussion of rate of publication per support dollar, etc., nor are they sought. While for NIH as a whole the correlation between funding and publication rate is extremely high (r = .90), such relationships may break down when smaller aggregates are analyzed. Characteristic differences between disciplines and classes of disciplines (e.g., clinical vs. basic science), between individual scientists and those working in interdisciplinary groups, among stages of development of subdiscipline specialty areas, etc., may mask a strong underlying relationship. Therefore, when small aggregates of data are the focus of interest, care in analyzing potential covariates is essential.

Figure 4

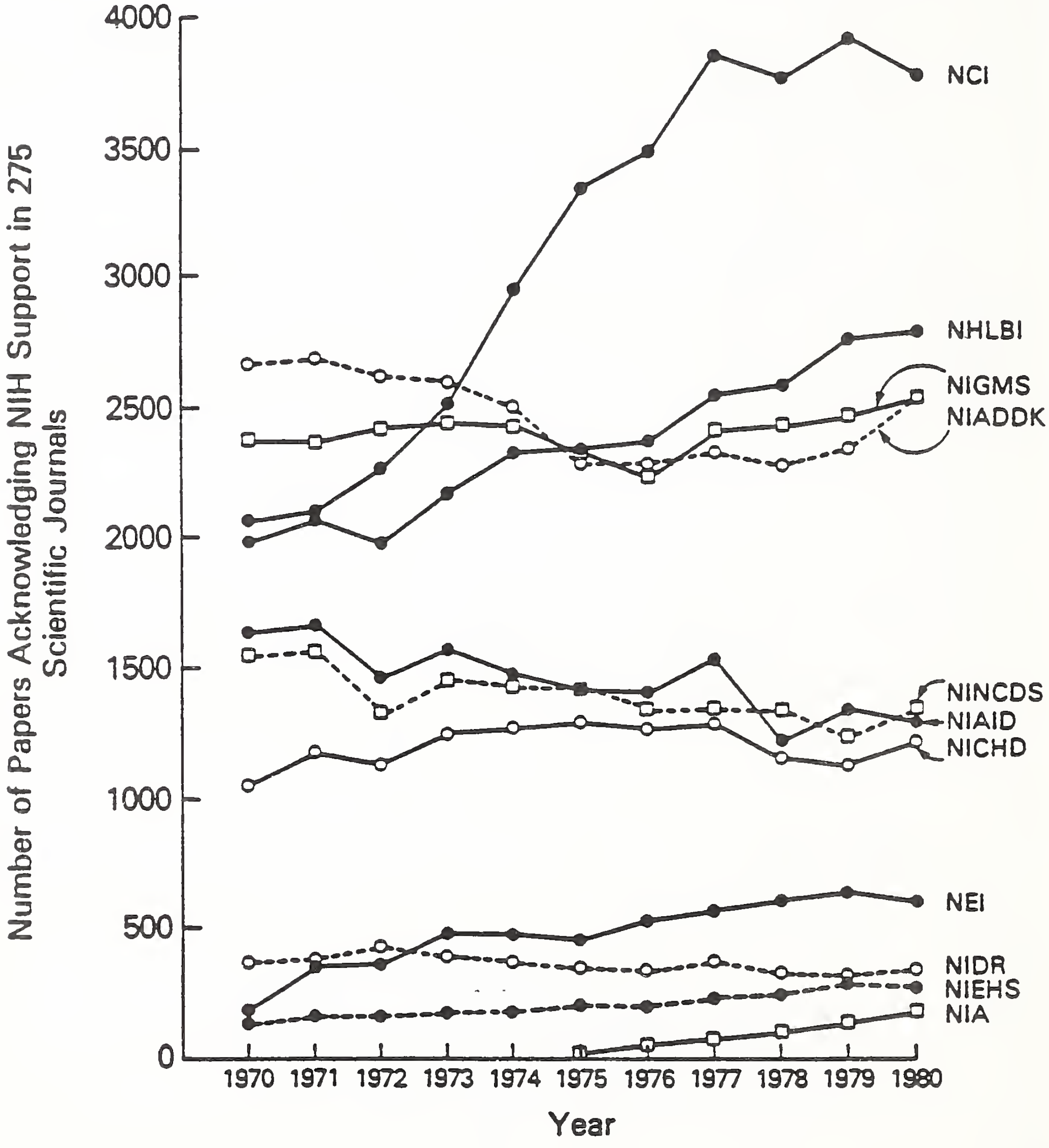
BID Obligations 1965-1980
(1969 Constant Dollars)



*Based on NIH Biomedical R&D Price Index

Figure 5

Acknowledgements of Research Support Appearing in 275 Scientific Journals



Note: The paper counts in this figure are for Fields 1 through 9, but 90 percent of the total papers are in Fields 1 and 2.

NIH PUBLICATION ACTIVITY

The tables and graphs in this section present a detailed bibliometric profile of NIH-supported research in the BID-MEDLINE journals. Since one goal of this report is to identify changes in NIH-supported research activity, most of the publication profile data are presented for two periods--1973-76 and 1977-80. Research-level and research-field profiles of NIH-supported papers are presented in Tables 3 and 4, and publication profiles relating NIH-supported papers to all BID-MEDLINE papers by research area are presented in Figures 6A, 6B, 7A, and 7B (constructed directly from data in Tables 5A and 5B).

Research-Level Profile

Table 3 presents the level classification of NIH-supported publications for the two periods 1973-76 and 1977-80. There was a decrease in the number and percent of NIH-supported papers at the more clinical levels (1 and 2) and an increase in number and percent of NIH-supported papers at the more basic levels--Clinical Investigation (Level 3) and Basic Research (Level 4). It should be noted that nearly 80 percent of the NIH-supported papers are at Levels 3 and 4, and that nearly 50 percent are at 4.

Table 3

Number and Percent of All NIH-Supported Papers in Fields 1 and 2 According to Research Level, 1973-76 and 1977-80

Level	1973-76		1977-80*	
	Number	Percent	Number	Percent
Levels 1 & 2 (Clinical Observation & Clinical Mix)	14,377	24%	13,786	21%
Level 3 (Clinical Investigation)	18,250	30	19,845	31
Level 4 (Basic Research)	27,316	46	31,279	48
Total	59,943	100%	64,910	100%

---

*1980 data include a 5 percent estimate for 1980 papers appearing on 1981 SCI tapes.

Publication Counts

Figures 6A and B show the percent of all papers in clinical medicine and biomedical research, respectively, in the BID-MEDLINE journal set that were NIH-supported. Publication activity for the two periods 1973-76 and 1977-80 is shown for each subfield. Clinical medicine comprises 32 subfields as defined in the 240-journal set; biomedical research, 14.

NIH supported a substantial number of papers in nearly every subfield. In Cancer and Immunology, NIH supported more than 40 percent of the total 1973-80 BID-MEDLINE papers. It supported more than 30 percent of all papers in seven other subfields of clinical medicine: Allergy, Cardiovascular System, Endocrinology, Hematology, Ophthalmology, Pathology, and Respiratory System.

Among the subfields designated as biomedical research, NIH supported more than 40 percent of all the 1973-80 papers in each of the following: Physiology, Anatomy-Morphology, and Virology. NIH supported more than 30 percent of the total papers in five additional subfields of biomedical research: Embryology, Biochemistry-Molecular Biology, Biophysics, Cell Biology-Cytology-Histology, and Miscellaneous Biomedical Research.

For most subfields the percent of total BID-MEDLINE papers that acknowledged NIH support decreased from the first period, 1973-76, to the second, 1977-80. These decreases occurred in 24 of the 32 subfields of clinical medicine (Figure 6A). The NIH share increased in only four of the clinical subfields. In the more basic subfields (Figure 6B), the NIH-supported proportion decreased in 6 and increased in 5 (of 14). As previously noted, foreign papers increased from 29.6 percent of the total BID-MEDLINE papers (Fields 1 and 2) to 32.9 percent, and the percent of papers that acknowledged no support increased from 20.5 to 23.1 percent (see Figure 3).

Activity Indexes

NIH publication activity is described from another perspective in Figures 7A and 7B, which show the distribution of "activity indexes" for the two periods 1973-76 and 1977-80. The activity index is a ratio of percentages; it is determined by dividing the percent of an Institute's papers in a subfield by the percent of all journal papers in the subfield (as subfields are defined in the BID-MEDLINE journal set). Expressed another way, the graphs display areas in which NIH's publication activity is high relative both to the size of NIH and to the size of the subfield. Thus, an activity index of 1.0 would represent equivalence between the size of the NIH effort in a given subfield and the size of the subfield in the BID-MEDLINE journal set. Activity indexes greater than 1.0 indicate areas of NIH relative emphasis.

The subfields in which NIH had high activity indexes (> 1.4), and had at least 1 percent of its papers, are Cancer, Immunology, Physiology, and Virology.

Figure 6A

Total NIH

Percent of All Papers in Each Subfield of Clinical Medicine Supported by or Performed by NIH

240 BID–MEDLINE Journals

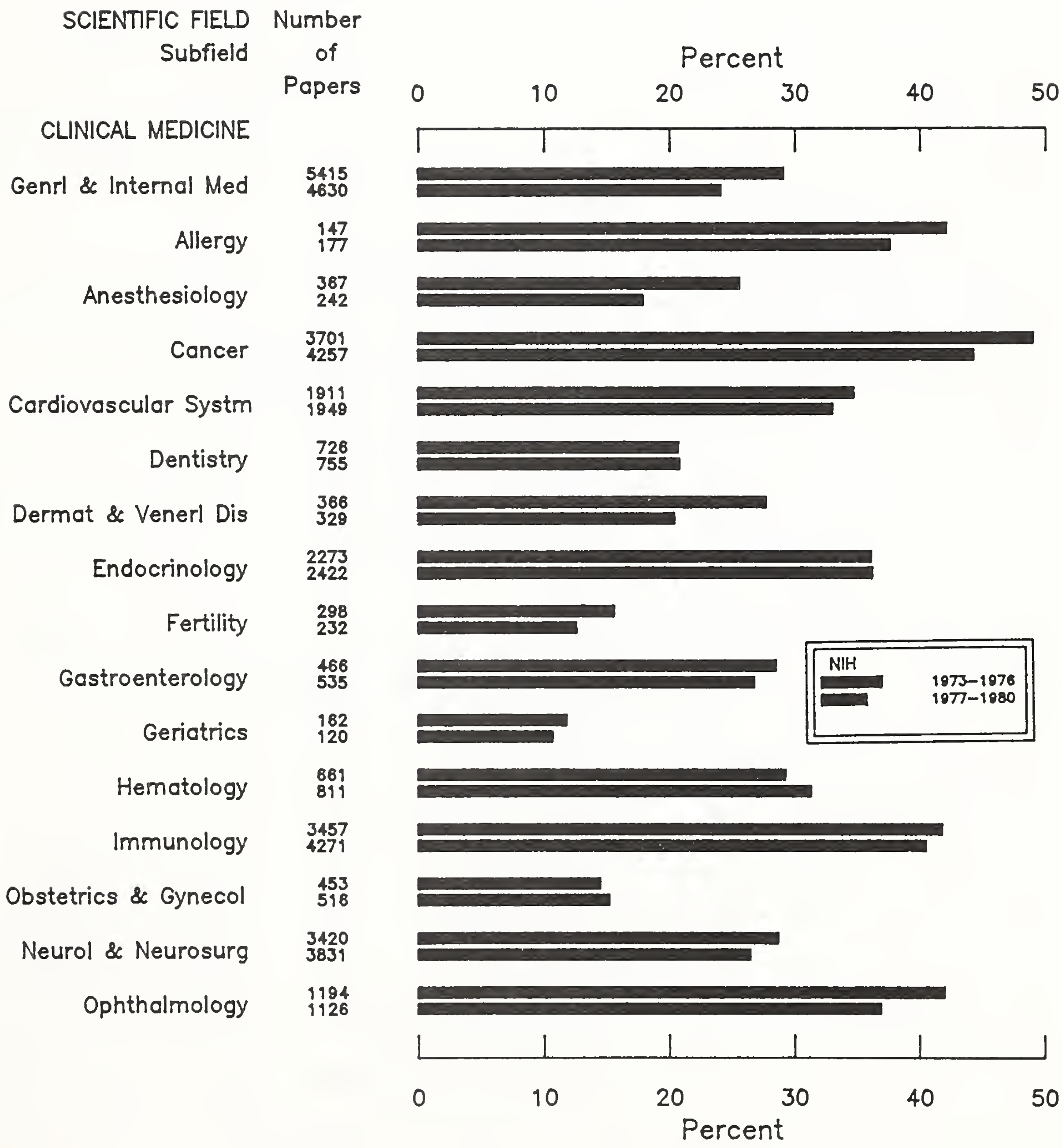


Figure 6A (Continued)

Total NIH

Percent of All Papers in Each Subfield of Clinical Medicine Supported by or Performed by NIH

240 BID-MEDLINE Journals

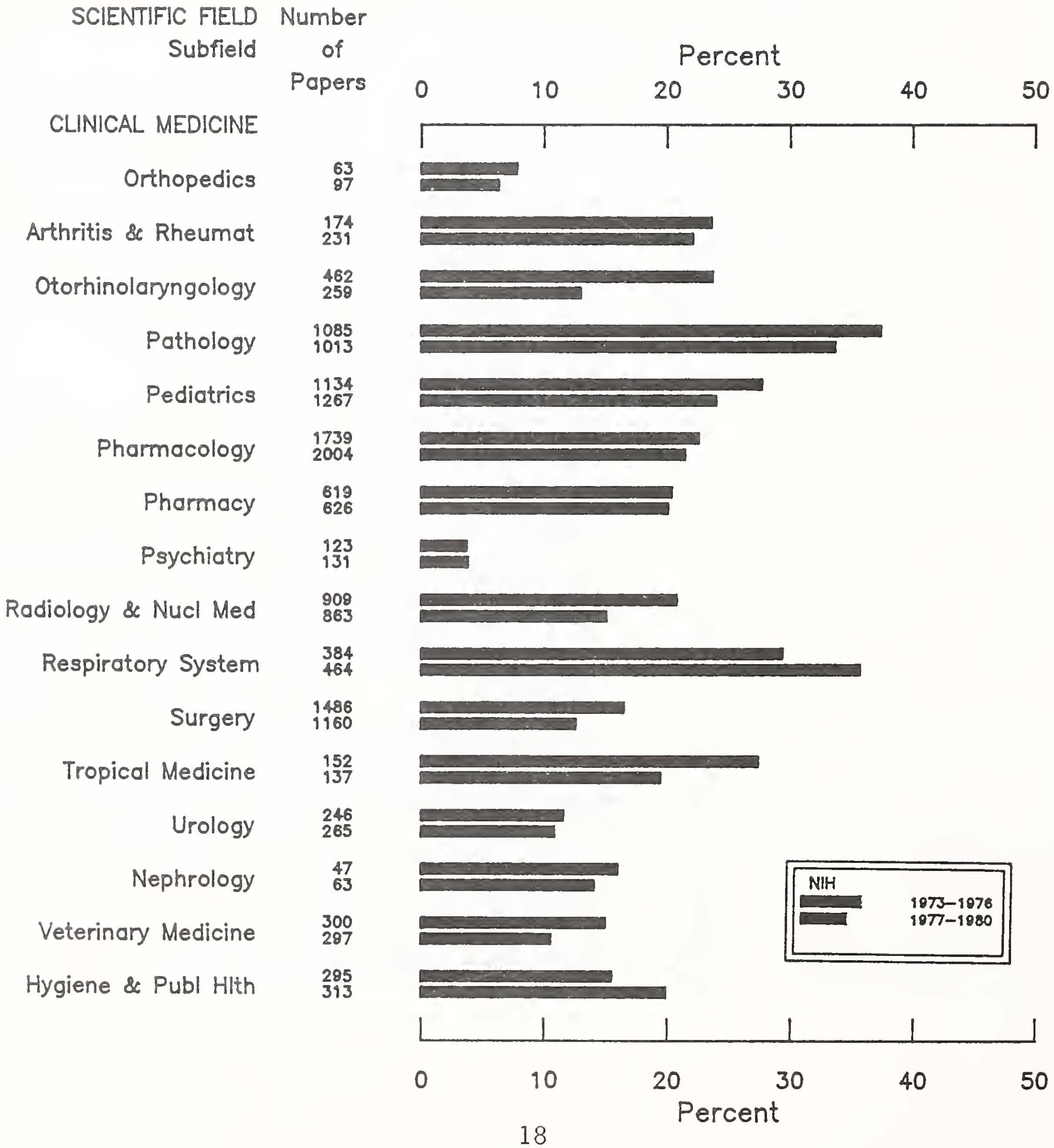


Figure 6B

Total NIH

Percent of All Papers in Each Subfield of Biomedical Research Supported by or Performed by NIH

240 BID—MEDLINE Journals

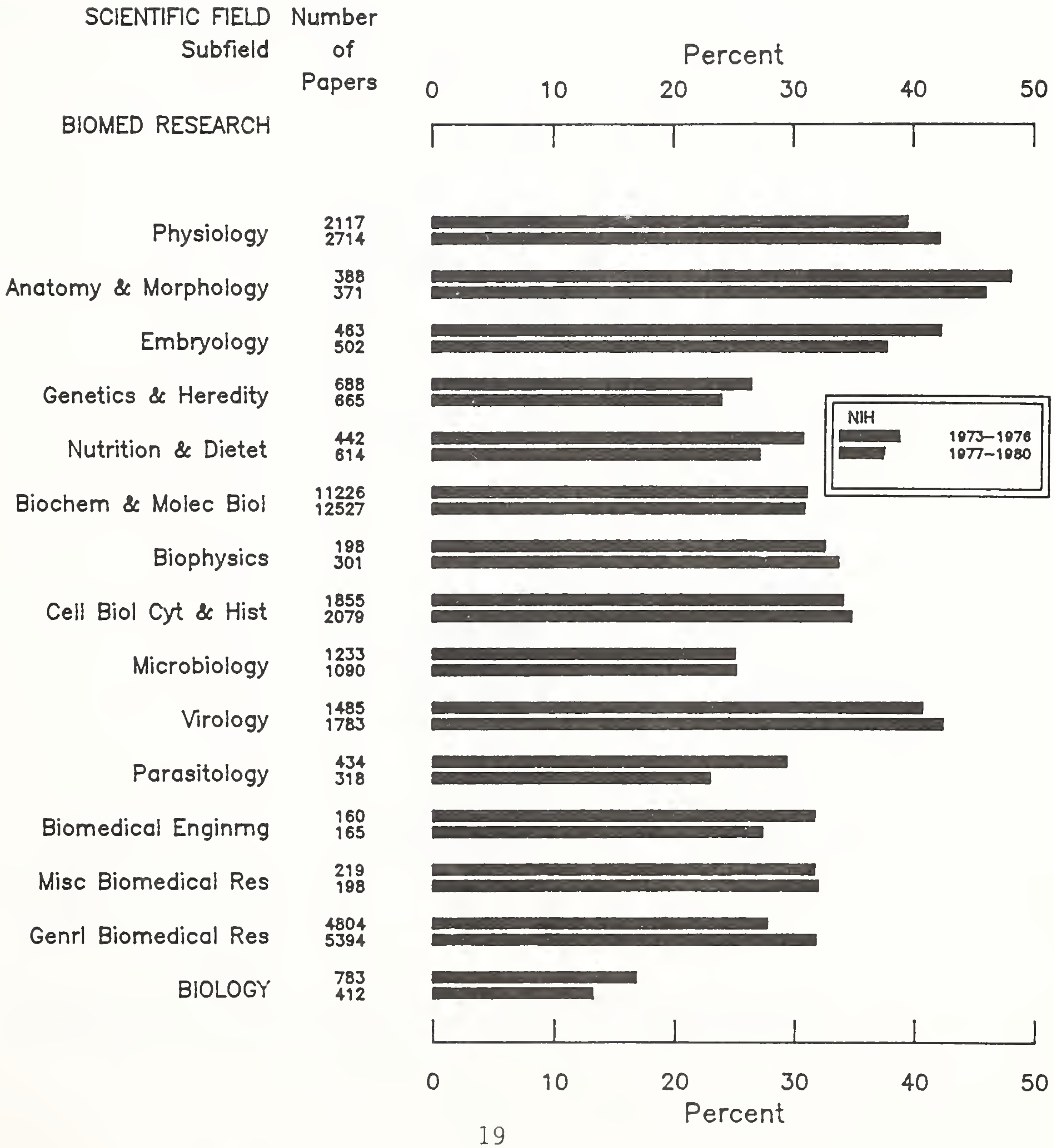
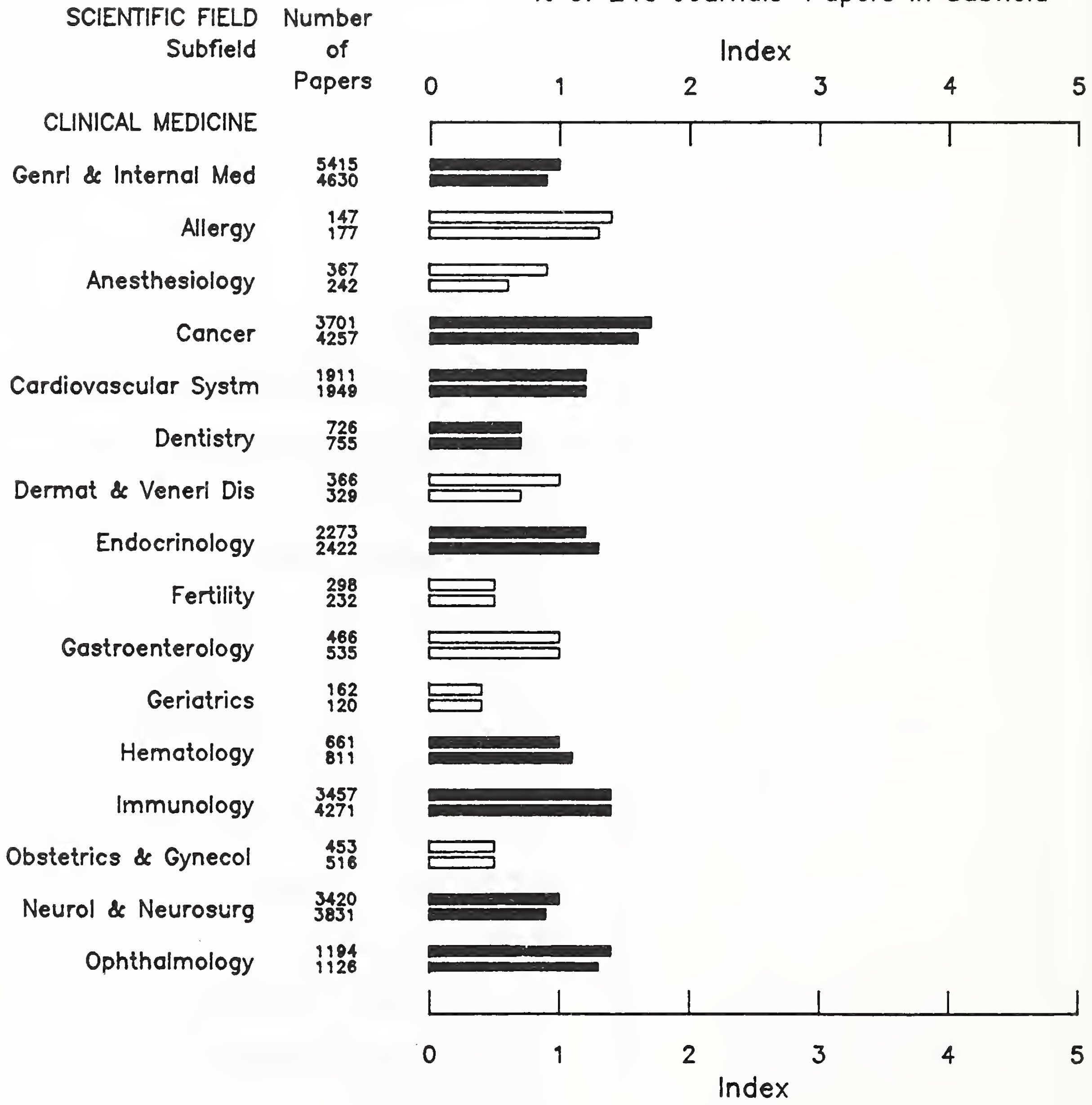


Figure 7A

Total NIH Activity Indexes in Subfields of Clinical Medicine

240 BID–MEDLINE Journals
1973–1976 over 1977–1980

$$\text{INDEX} = \frac{\text{\% of Institute's Papers in Subfield}}{\text{\% of 240 Journals' Papers in Subfield}}$$



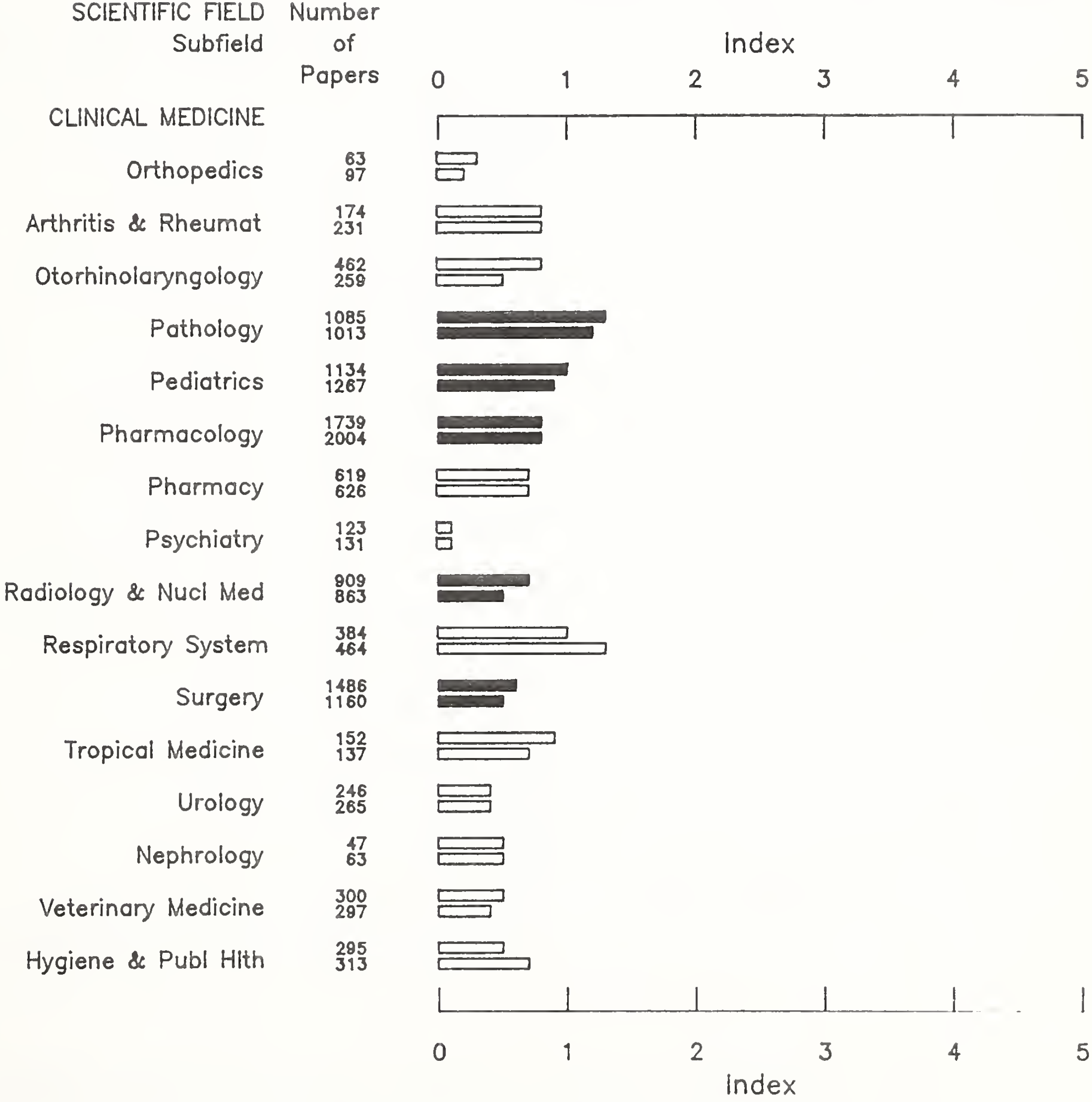
Note: Open bars designate subfields that contained less than 1 percent of the papers acknowledging NIH support in the given period.

Figure 7A (Continued)

Total NIH Activity Indexes in Subfields of Clinical Medicine

240 BID–MEDLINE Journals
1973–1976 over 1977–1980

$$\text{INDEX} = \frac{\text{\% of Institute's Papers in Subfield}}{\text{\% of 240 Journals' Papers in Subfield}}$$



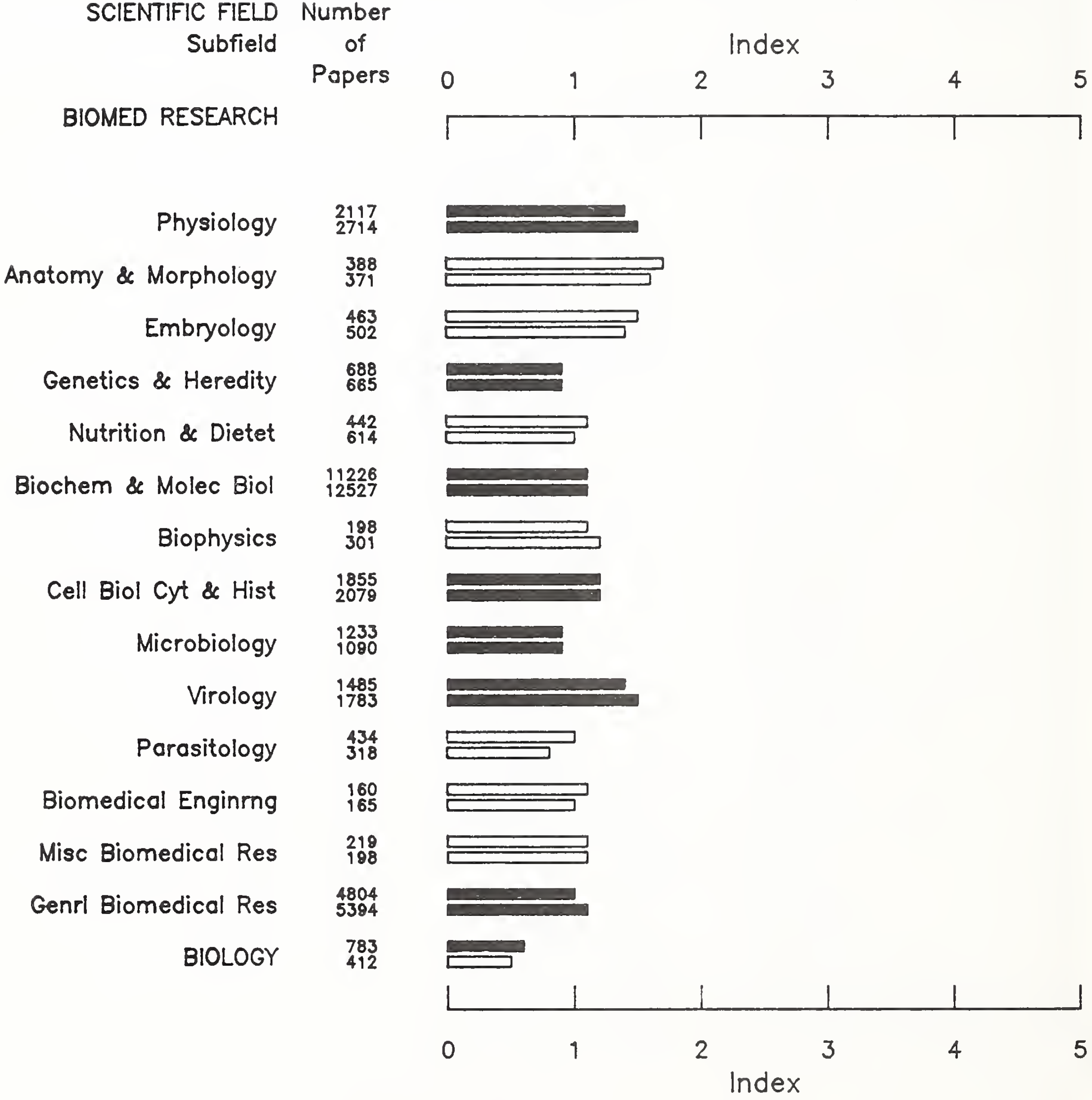
Note: Open bars designate subfields that contained less than 1 percent of the papers acknowledging NIH support in the given period.

Figure 7B

Total NIH Activity Indexes in Subfields of Biomedical Research

240 BID–MEDLINE Journals
1973–1976 over 1977–1980

$$\text{INDEX} = \frac{\text{\% of Institute's Papers in Subfield}}{\text{\% of 240 Journals' Papers in Subfield}}$$



Note: Open bars designate subfields that contained less than 1 percent of the papers acknowledging NIH support in the given period.

Publication Trends

Another perspective on NIH research dynamics may be gained in comparing the rate of change in NIH-supported papers with changes occurring in Other U.S.- authored and U.S.-supported papers over the same period. Table 4 presents changes for NIH and for Other-U.S. in each of the selected subfields.

Of the total number of papers published by the BIO-MEDLINE journals during 1973-77 and 1977-80, NIH supported 41 and 42 percent. However, the NIH-supported share of papers in basic biomedical journals rose from 50 to 54 percent, while the share of clinical papers decreased from 36 to 34 percent. The Percent Change figures in Table 4 depict these changes by discipline. While the number of NIH-supported biomedical research papers increased 11.7 percent, papers not supported by NIH decreased 7.1 percent. Concurrently, NIH-supported clinical research increased insignificantly (3.4 percent) while clinical research papers not supported by NIH increased 11.7 percent. It is apparent that during the 70's clinical investigators who were not supported by the NIH substantially increased their publication activity. Meanwhile, NIH support shifted slightly toward the more basic biomedical sciences. These results suggest greater independence of clinical research and greater access to alternative sources of support.

Although the overall number of NIH-supported clinical research papers increased only 3.4 percent in the 1977-80 period, that figure masks wide-ranging shifts in emphasis among NIH-supported clinical investigations. These changes range from a 43.9 percent decrease (in Otorhinolaryngology) to a 54 percent increase (in Orthopedics). The NIH role in Otorhinolaryngology declined from 39 to 18 percent as the research papers that were not supported by NIH increased 22.4 percent. The circumstance in Orthopedics is different only with respect to the evidence of increased NIH involvement. The NIH increase is overshadowed by a 78 percent increase in the number of papers supported by other U.S. sources. Despite increased interest, the NIH share of Orthopedics research papers declined from 11 to 9 percent. Other subfields in which the rate of increase in NIH-supported research lagged behind more rapidly increasing activity outside of the NIH purview include Allergy, Arthritis and Rheumatology, Cancer, Nephritis, and Neurology and Neurosurgery.

Other subfields in which NIH support decreased notably, as compared with other U.S., are, (besides Otorhinolaryngology), Anesthesiology, Surgery, General and Internal Medicine, and Dermatology-Venereal Diseases. In all five of these subfields, the number of NIH-supported papers dropped both absolutely and relatively from the 1973-76 period to the 1977-80. In two other fields, Geriatrics and Fertility, both NIH and Other-U.S. papers decreased markedly.

A different kind of dynamic is implied when substantial increases in the number of papers acknowledging NIH support are accompanied by significant decreases in the Other-U.S. category. This kind of change occurred in Hematology, Respiratory System research and Virology. Clearly, strong or rapid increases in programmatic emphases may not immediately change the national pace of production of publishable research. It is conceivable, however, that in the process of drawing a large proportion of the national effort into the NIH milieu, a new vigor may be generated that will later find expression in significant scientific advances and increased productivity. As 1980's data become available, the outcome, if not the operating dynamics, will become evident.

Table 4

Changes in Number and Percent of Papers Supported by NIH and the Rest of the Nation, in Selected Subfields (240 BID-MEDLINE Journals), 1973-76 and 1977-80

	Number of Papers		
	1973-76	1977-80	Percent Change
Fields 1 and 2 Combined			
All NIH	59,945	64,113	7.0
Other U.S.	84,934	89,733	5.7
Clinical Medicine [Field 1]			
All NIH	34,232	35,390	3.4
Other U.S.*	58,994	65,638	11.3
General and Internal Medicine			
All NIH	5,415	4,630	-14.5
Other U.S.	8,551	9,343	9.3
Allergy			
All NIH	147	177	20.4
Other U.S.	155	217	40.0
Anesthesiology			
All NIH	367	242	-34.1
Other U.S.	938	973	3.7
Arthritis and Rheumatism			
All NIH	174	231	32.8
Other U.S.	242	358	47.9
Cancer			
All NIH	3,701	4,257	15.0
Other U.S.	2,274	3,143	38.2
Cardiovascular System			
All NIH	1,911	1,949	2.0
Other U.S.	2,712	2,807	3.5
Dentistry			
All NIH	726	755	4.0
Other U.S.	1,717	1,779	3.6

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*Other U.S. includes all U.S.-authored and U.S.-supported papers except those supported by NIH.

Table 4

Changes in Number and Percent of Papers Supported by NIH and the Rest of the Nation, in Selected Subfields (240 BID-MEDLINE Journals), 1973-76 and 1977-80 (Continued)

	Number of Papers		
	1973-76	1977-80	Percent Change
Dermatology and Venereal Diseases			
All NIH	366	329	-10.1
Other U.S.	755	921	22.0
Endocrinology			
All NIH	2,273	2,422	6.6
Other U.S.	1,944	1,590	-18.2
Fertility			
All NIH	298	232	-22.1
Other U.S.	781	636	-18.6
Gastroenterology			
All NIH	466	535	14.8
Other U.S.	782	844	7.9
Geriatrics			
All NIH	162	120	-25.9
Other U.S.	1,046	789	-24.6
Hematology			
All NIH	661	811	22.7
Other U.S.	524	460	-12.2
Immunology			
All NIH	3,457	4,271	23.5
Other U.S.	2,367	2,616	10.5
Nephrology			
All NIH	47	63	34.0
Other U.S.	97	155	59.8
Neurology and Neurosurgery			
All NIH	3,420	3,431	12.0
Other U.S.	3,874	5,147	32.9
Obstetrics and Gynecology			
All NIH	453	516	13.9
Other U.S.	2,049	2,169	5.9

Table 4

Changes in Number and Percent of Papers Supported by NIH and the Rest of the Nation, in Selected Subfields (240 BID-MEDLINE Journals), 1973-76 and 1977-80 (Continued)

	Number of Papers		
	1973-76	1977-80	Percent Change
Ophthalmology			
All NIH	1,194	1,126	-5.7
Other U.S.	1,229	1,467	19.4
Orthopedics			
All NIH	63	97	54.0
Other U.S.	582	1,036	78.0
Otorhinolaryngology			
All NIH	462	259	-43.9
Other U.S.	1,185	1,451	22.4
Pathology			
All NIH	1,085	1,013	-6.6
Other U.S.	1,329	1,459	9.8
Pediatrics			
All NIH	1,134	1,267	11.7
Other U.S.	2,248	2,994	33.2
Pharmacology			
All NIH	1,739	2,004	15.2
Other U.S.	3,256	3,483	7.0
Pharmacy			
All NIH	619	626	1.1
Other U.S.	1,867	1,744	-6.6
Psychiatry			
All NIH	123	131	6.5
Other U.S.	2,483	2,589	4.3
Radio and Nuclear Medicine			
All NIH	909	863	-5.1
Other U.S.	2,845	3,989	40.2
Respiratory System			
All NIH	384	464	20.8
Other U.S.	579	437	-24.5

Table 4

Changes in Number and Percent of Papers Supported by NIH
and the Rest of the Nation, in Selected Subfields
(240 BID-MEDLINE Journals), 1973-76 and 1977-80
(Continued)

	Number of Papers		
	1973-76	1977-80	Percent Change
Surgery			
All NIH	1,486	1,160	-21.9
Other U.S.	6,127	6,274	2.4
Tropical Medicine			
All NIH	152	137	-9.9
Other U.S.	262	330	26.0
Urology			
All NIH	246	265	7.7
Other U.S.	1,539	1,670	8.5
Veterinary Medicine			
All NIH	300	297	-1.0
Other U.S.	1,583	2,255	42.5
Hygiene and Public Health			
All NIH	295	313	6.1
Other U.S.	1,069	906	-15.2
Biomedical Research [Field 2]			
All NIH	25,711	28,721	11.7
Other U.S.	25,944	24,104	-7.1
Anatomy and Morphology			
All NIH	388	371	-4.4
Other U.S.	250	244	-2.4
Biochemistry and Molecular Biology			
All NIH	11,226	12,527	11.6
Other U.S.	9,119	8,822	-3.3
Biomedical Engineering			
All NIH	160	165	3.1
Other U.S.	242	274	13.2
Biophysics			
All NIH	198	301	52.0
Other U.S.	293	356	21.5

Table 4

Changes in Number and Percent of Papers Supported by NIH
and the Rest of the Nation, in Selected Subfields
(240 BID-MEDLINE Journals), 1973-76 and 1977-80
(Continued)

	Number of Papers		
	1973-76	1977-80	Percent Change
Embryology			
All NIH	463	502	8.4
Other U.S.	385	421	9.4
Genetics and Heredity			
All NIH	688	665	-3.3
Other U.S.	827	771	-6.8
Microbiology			
All NIH	1,233	1,090	-11.6
Other U.S.	2,009	1,490	-25.8
Nutrition and Dietetics			
All NIH	442	614	38.9
Other U.S.	693	1,027	48.2
Cell Biology, Cytology, and Histology			
All NIH	1,855	2,079	12.1
Other U.S.	1,541	1,572	2.0
Parasitology			
All NIH	434	318	-26.7
Other U.S.	713	627	-12.1
Physiology			
All NIH	2,117	2,714	28.2
Other U.S.	1,723	1,622	-5.9
Virology			
All NIH	1,485	1,783	20.1
Other U.S.	1,099	953	-13.3
General Biomedical Research			
All NIH	4,804	5,394	12.3
Other U.S.	6,697	5,609	-16.2
Miscellaneous Biomedical Research			
All NIH	219	198	-9.6
Other U.S.	351	314	-10.5

NIH CITATION PERFORMANCE

The distribution of the number of citations received by any aggregate of journal papers is extremely skewed. In general, relatively few papers in a field are highly cited, and relatively many are cited once or twice or not at all. Given these skewed distributions, measures of central tendency are of somewhat limited value as analytic tools. By making use of all the information in a distribution of citation rates, however, it is possible to create a statistic that permits comparison of the rates achieved by supported researchers in different disciplines. "T-scores" provide such information (see page 34 for a description of the method of computation). An alternative way of assessing citation impact is to compare the frequency of highly cited papers between groups.

Figure 8* shows the percent of NIH-supported papers that are in the top decile of cited papers in each subfield represented in the BID-MEDLINE journal set. This statistic has the advantage that a top decile is interpretable across both subfields and years, even though the proportions are based upon different numbers of citations in each cited year and in each subfield.

Citations from 1973-80 papers to journal papers published between 1973 and 1977 were used to formulate Figure 8. Graphic representations are limited to the subfields in which more than 1 percent of NIH's supported papers appear.

In each of the 21 subfields in which NIH was most active over the entire period, more than 10 percent of the NIH-supported papers were in the top decile of cited papers. The figure does not reveal that in each of 46 subfields in which NIH supported any papers, more than 10 percent were in the top decile. Moreover, in eight of these subfields, more than 20 percent of the NIH-supported papers were in the top decile (see Table 5).

Historical trends can be observed in Tables 5A and 5B, where complete profiles for the two periods 1973-76 and 1977-80 are presented.

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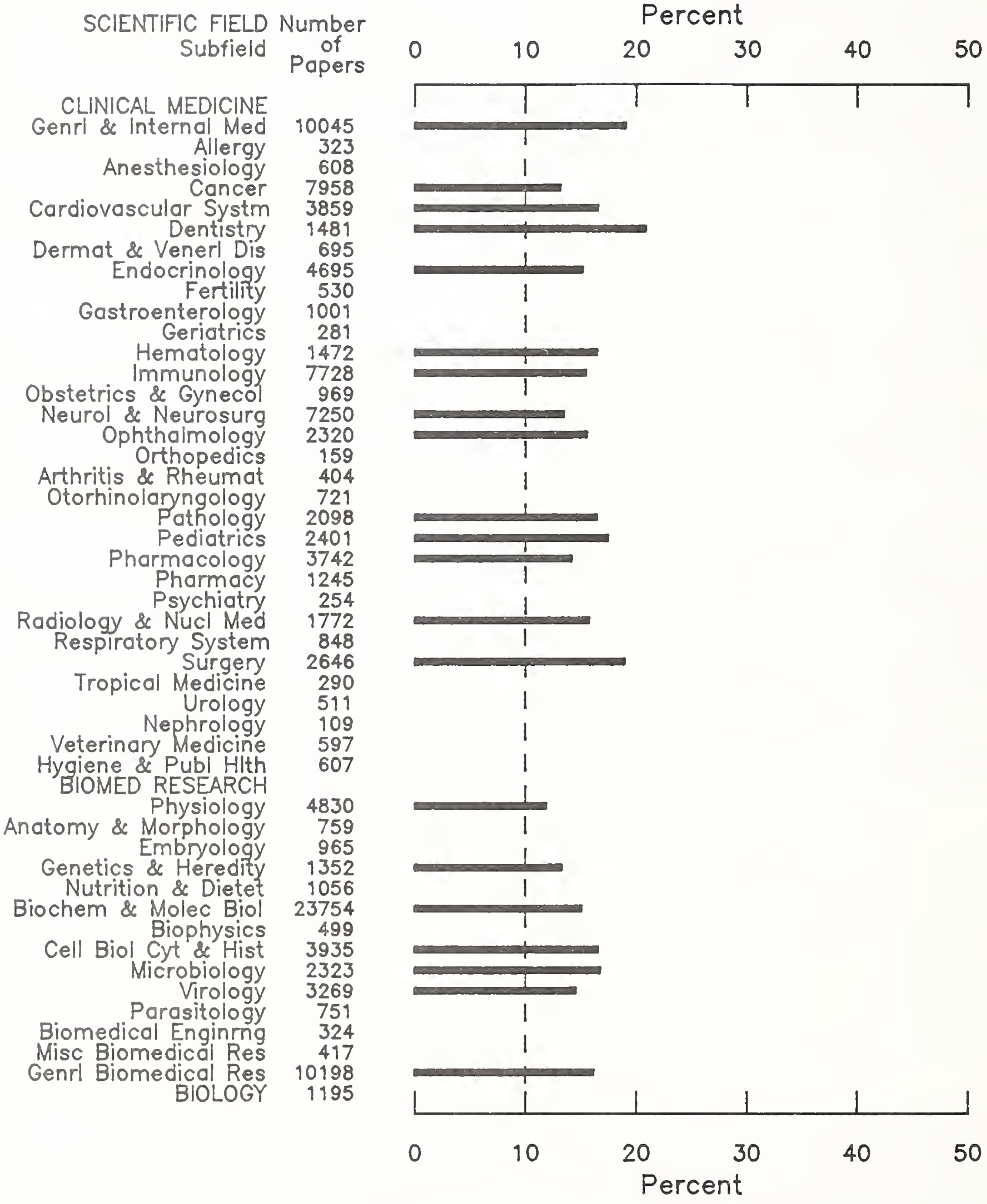
*The data in Figure 8 are not be be compared with those of the corresponding figure in the previous report, which covered the 1970-76 publications (ref.11). Note that the period covered in the present report is 1973-77, and that subfields including fewer than 1 percent of the BID's supported papers are not charted.

Figure 8

Total NIH

Percent of BID's Papers in Top Decile of Cited Papers
1973–1980 Papers in 240 BID–MEDLINE Journals



NOTE: No values shown for scientific subfields with less than 1 percent of papers for this BID.

NIH SUPPORT-SOURCE INTERDEPENDENCY

It is well known that the scientific interests of individual support sources intersect and interact. The lay public and even some scientists have difficulty comprehending the complexity of these relations. Diagrams may be helpful. Figures 9 and 10 are based on mapping the citation interaction among scientists supported by various sources. Corresponding figures in the other reports of this series highlight the role of the individual BIDs.

Figure 9A, based on the references listed in NIH-supported papers, illustrates the dependence of NIH research on information supported by NIH and non-NIH sources. Fifty-two percent of the references in NIH-supported papers were to other papers supported by NIH, and 48 percent were to papers supported by others. The percent of NIH references to each of the BIDs is largely a reflection of their relative sizes. Thus, NCI, NHLBI, NIADDK, and NIGMS receive the largest share of NIH references to NIH-supported papers.

The papers that give no support acknowledgements are likely to cite "clinical observations"--i.e., practicing physicians' observations of notable experience with a small group of patients. Eighteen percent of the NIH references are to papers of foreign (non-U.S.-supported) scientists.

Figure 9B presents the converse of 9A, showing the citations of NIH-supported papers according to the referencing sources. Forty-six percent of the citations received by NIH-supported papers were from papers supported by NIH, while 54 percent were from papers with other support. Again, the percent of NIH citations received from each of the BIDs largely reflects its relative size. NIH receives 23.4 percent of its citations from foreign papers.

Clearly, any decisions that would significantly affect the programmatic structure of NIH would have important effects on a worldwide community of investigators.

Figure 10 represents (a) the various supporters of research reported in the entire journal set, with the areas of the circles proportional to the number of supported papers, and (b) citations by and of NIH-supported papers, showing the same percent distributions as in Figures 9A and 9B. "Foreign," the largest circle, represents papers by authors from foreign institutions who acknowledged no U.S. support. Arrows pointing outward represent references by NIH-supported authors, and arrows pointing inward represent citations of those authors' works.

Figure 9A
PERCENT DISTRIBUTION OF REFERENCES IN NIH-SUPPORTED PAPERS, 1978-80, TO PAPERS SUPPORTED BY NIH AND OTHER SOURCES, 1973-80

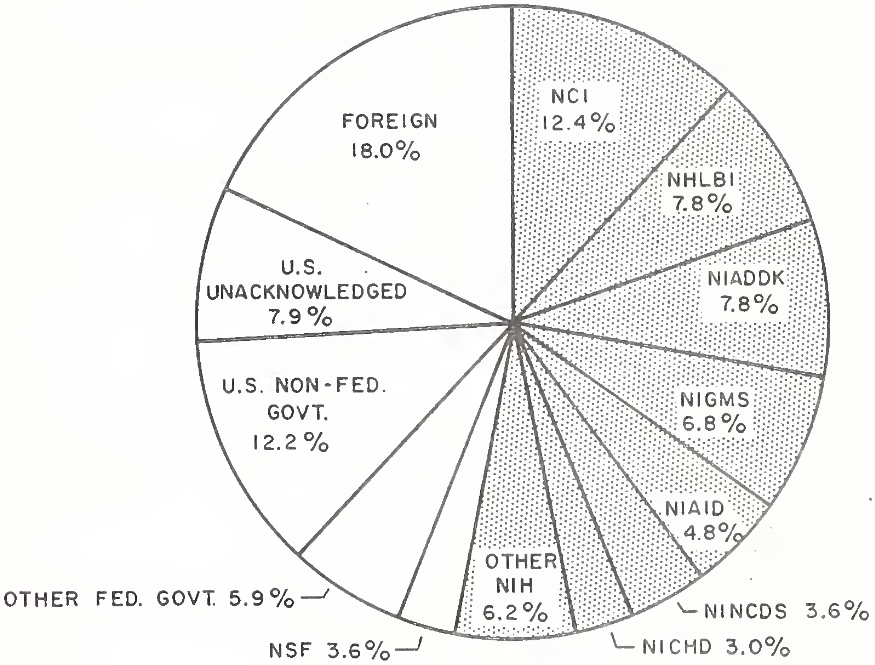


Figure 9B
PERCENT DISTRIBUTION OF CITATIONS OF SUPPORTED PAPERS, 1973-80, IN PAPERS SUPPORTED BY NIH AND OTHER SOURCES, 1978-80

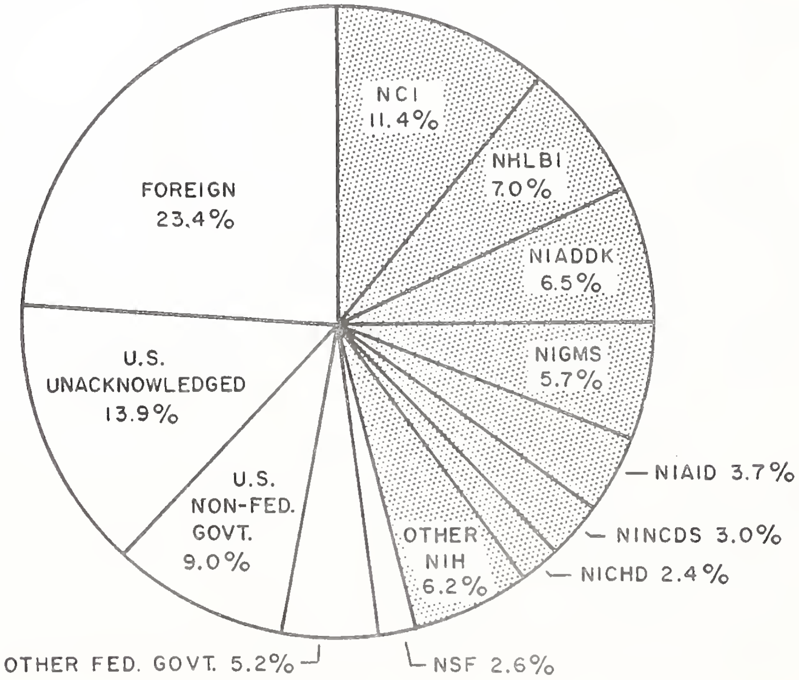
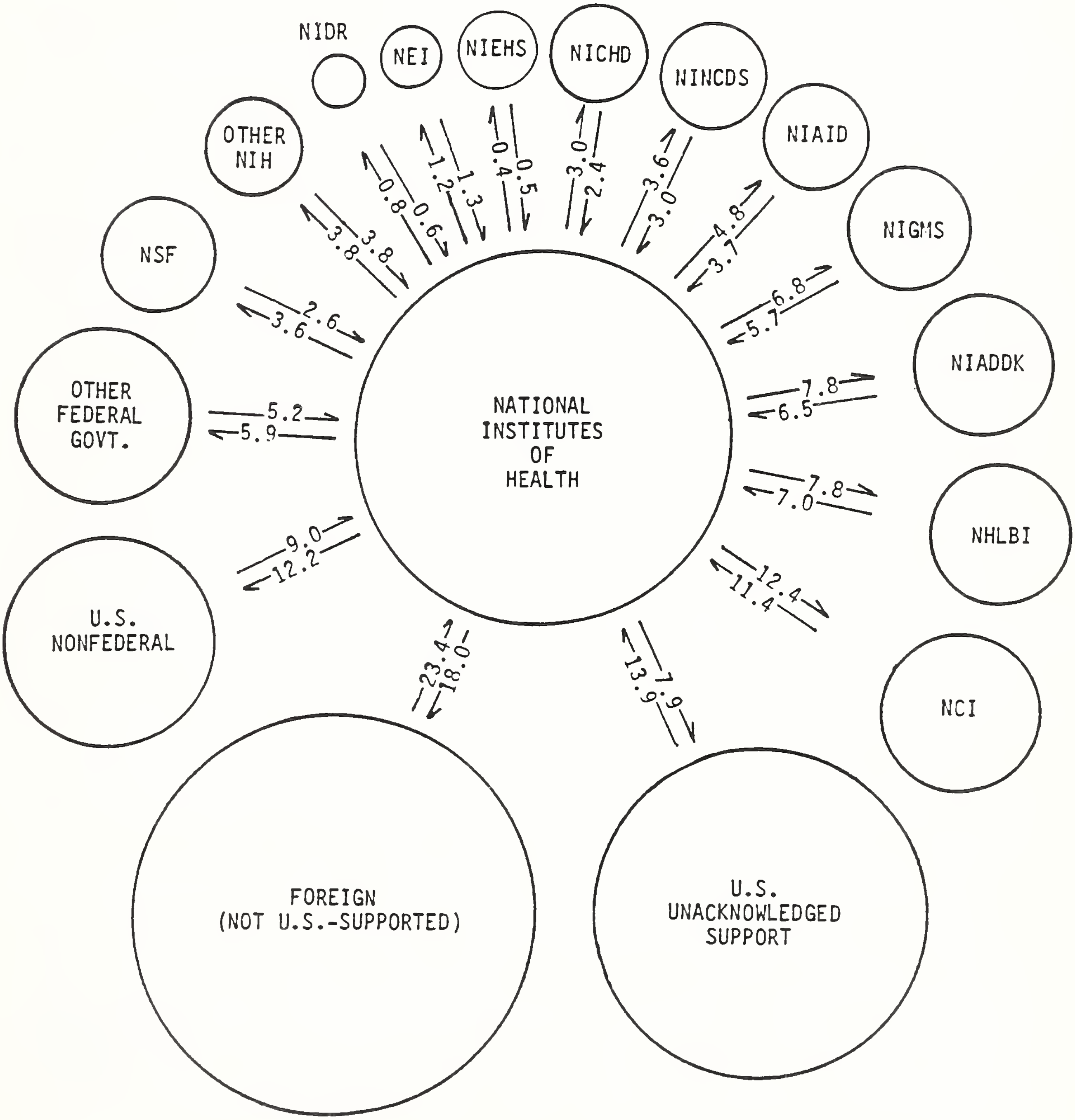


Figure 10

UNIVERSE OF PUBLICATIONS CITED BY AND CITING
NIH-SUPPORTED PAPERS

Area of Circles Proportional to Number of
Publications Supported; Citations by Percent



PUBLICATION PROFILE*

Table 5A is a profile of the bibliometric activity of NIH for the period 1973-76. It counts all papers published in the 240 BID-MEDLINE journal set in the years 1973-76 and counts citations received by these papers from the 275-journal set from 1973 through 1980.

Similarly, Table 5B is a profile of NIH for the period 1977-80.

The first page of each table presents the data for all fields combined, for each research level, and for each of the major fields. The second page lists the individual subfields of clinical medicine and biomedical research. The column headings are defined as follows:

1 Number of Papers - The fractional number of papers supported by NIH in the particular level, field, and subfield (L/F/S).

2 Activity Index - Proportion of NIH's papers in the L/F/S divided by the proportion of all papers in the BID-MEDLINE journal set in that L/F/S.

3 % Internal Effort - Percent of NIH's papers in the particular L/F/S.

4 % External Effort - Percent of all papers in the BID-MEDLINE journal set in the particular L/F/S that were supported by NIH.

5 Total Cites - Total citations (from all journals in the BID-MEDLINE set for citing years 1973-80) received by the papers supported by NIH in the particular L/F/S. Scaled to the average citation rate for each L/F/S in 1973.

6 Cites per Paper - Total scaled citations received by NIH's papers in a given L/F/S, divided by the number of papers supported.

7 Cite T-Score - NIH's average citations per paper minus the average citations per paper for all papers in the particular L/F/S, divided by the standard deviation of citations per paper for all papers in that L/F/S. The statistic is scaled to a mean of 50 and a standard deviation of 10.

8 % Papers Among the Top 10% - Percent of NIH's papers in the particular L/F/S that are among the 10 percent most highly cited papers in that L/F/S.

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*Although the publication profile presents analyses for any number of papers, the data are likely to be unstable when based on aggregates of less than 25. The skewness of citation distributions permits only approximate statements about confidence limits. It may be said, however, that a sample size of 20 is required to achieve a 95 percent confidence interval of ±2 citations.

Table 5A

BIBLIOMETRIC PROFILE OF NIH-SUPPORTED RESEARCH, 1973-76*

FIELD/LEVEL	NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
************************ NORMALIZED AGAINST FIELDS [1-2] ************************								
FIELDS [1-2]	59945.	1.00	100.00	29.11	852029.	14.2	53.15	16.28
CLIN MEDICINE [1]	34232.	0.95	57.11	27.61	395714.	11.6	54.69	17.92
BIOMED RESEARCH [2]	25711.	1.08	42.89	31.38	457077.	17.8	52.30	15.50
LEVEL								
CLINICAL-MIX [1-2]	14377.	0.72	23.98	21.07	137827.	9.6	55.67	19.53
CLIN INVESTIGATN [3]	18250.	1.25	30.44	36.35	227478.	12.5	53.64	15.33
BASIC RESEARCH [4]	27316.	1.07	45.57	31.22	487059.	17.8	52.27	15.08
************************ NORMALIZED AGAINST FIELDS [1-9] ************************								
FIELDS [1-9]	62421.	1.00	100.00	28.16	865353.	13.9	53.32	16.92
CLIN MEDICINE [1]	34232.	0.98	54.84	27.61	395714.	11.6	54.69	17.92
BIOMED RESEARCH [2]	25711.	1.11	41.19	31.38	457077.	17.8	52.30	15.50
BIOLOGY [3]	783.	0.60	1.25	16.83	3829.	4.9	52.24	15.76
CHEMISTRY [4]	827.	0.80	1.32	22.59	7879.	9.5	53.36	15.12
PHYSICS [5]	119.	0.97	0.19	27.28	865.	7.3	55.27	20.65
EARTH & SPACE SC [6]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
ENGRNG & TECHNOL [7]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
PSYCHOLOGY [8]	748.	0.38	1.20	10.67	3314.	4.4	54.91	21.14
MATHEMATICS [9]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00

NOTE: CHEMISTRY AND PSYCHOLOGY DATA SHOULD BE TREATED CAUTIOUSLY OVER TIME DUE TO INCONSISTENT DATABASE COVERAGE.

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*BID-SCI journal set citing BID-MEDLINE papers, 1973-80. Activity index normalized against Fields 1 and 2. Citation counts scaled within subfield to 1973 equivalents.

Table 5A (Continued)

BIBLIOMETRIC PROFILE OF NIH-SUPPORTED RESEARCH, 1973-76*

FIELD/SUBFIELD	NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
CLIN MEDICINE [1]								
GENRL & INTERNAL MED	5415.	1.00	9.03	29.10	84240.	15.6	56.18	18.50
ALLERGY	147.	1.45	0.24	42.10	1157.	7.9	51.24	13.08
ANESTHESIOLOGY	367.	0.88	0.61	25.61	2301.	6.3	56.09	22.82
CANCER	3701.	1.68	6.17	49.00	51296.	13.9	52.29	13.33
CARDIOVASCULAR SYSTM	1911.	1.19	3.19	34.68	29803.	15.6	55.34	16.30
DENTISTRY	726.	0.71	1.21	20.74	3225.	4.4	54.91	21.16
DERMAT & VENERL DIS	366.	0.95	0.61	27.74	1905.	5.2	56.42	19.78
ENDOCRINOLOGY	2273.	1.24	3.79	36.06	33639.	14.8	55.23	14.75
FERTILITY	298.	0.54	0.50	15.64	1590.	5.3	51.48	14.92
GASTROENTEROLOGY	466.	0.98	0.78	28.54	4971.	10.7	56.96	16.31
GERIATRICS	162.	0.40	0.27	11.77	557.	3.4	56.97	28.84
HEMATOLOGY	661.	1.01	1.10	29.26	5702.	8.6	53.77	16.15
IMMUNOLOGY	3457.	1.43	5.77	41.77	59210.	17.1	53.64	15.77
OBSTETRICS & GYNECOL	453.	0.50	0.76	14.49	3549.	7.8	54.41	17.48
NEUROL & NEUROSURG	3420.	0.98	5.70	28.65	41968.	12.3	51.98	13.30
OPHTHALMOLOGY	1194.	1.44	1.99	42.02	6985.	5.9	52.98	15.62
ORTHOPEDICS	63.	0.27	0.10	7.79	392.	6.3	56.98	22.13
ARTHRITIS & RHEUMAT	174.	0.81	0.29	23.62	1990.	11.4	62.43	21.86
OTORHINOLARYNGOLOGY	462.	0.82	0.77	23.74	1636.	3.5	53.35	16.52
PATHOLOGY	1085.	1.29	1.81	37.41	8411.	7.8	53.63	15.61
PEDIATRICS	1134.	0.95	1.89	27.71	8282.	7.3	54.92	16.23
PHARMACOLOGY	1739.	0.78	2.90	22.64	19470.	11.2	52.53	15.42
PHARMACY	619.	0.70	1.03	20.38	4052.	6.5	54.16	18.31
PSYCHIATRY	123.	0.13	0.21	3.73	794.	6.4	53.67	15.97
RADIOLOGY & NUCL MED	909.	0.72	1.52	20.82	5324.	5.9	52.20	14.67
RESPIRATORY SYSTEM	384.	1.01	0.64	29.37	3177.	8.3	52.99	16.31
SURGERY	1486.	0.57	2.48	16.49	10662.	7.2	54.74	18.54
TROPICAL MEDICINE	152.	0.94	0.25	27.37	635.	4.2	51.78	14.79
UROLOGY	246.	0.40	0.41	11.55	1090.	4.4	53.38	18.55
NEPHROLOGY	47.	0.55	0.08	15.98	249.	5.4	51.85	10.04
VETERINARY MEDICINE	300.	0.52	0.50	15.02	922.	3.1	51.42	15.37
ADDICTIVE DISEASES	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
HYGIENE & PUBL HLTH	295.	0.53	0.49	15.47	1787.	6.1	61.01	27.77
BIOMED RESEARCH [2]								
PHYSIOLOGY	2117.	1.36	3.53	39.53	31284.	14.8	51.02	11.76
ANATOMY & MORPHOLOGY	388.	1.65	0.65	48.14	2360.	6.1	51.05	13.23
EMBRYOLOGY	463.	1.45	0.77	42.34	5666.	12.2	53.55	14.54
GENETICS & HEREDITY	688.	0.91	1.15	26.55	6829.	9.9	50.58	11.78
NUTRITION & DIETET	442.	1.06	0.74	30.81	3608.	8.2	55.52	15.81
BIOCHEM & MOLEC BIOL	11226.	1.07	18.73	31.06	214266.	19.1	51.83	15.02
BIOPHYSICS	198.	1.12	0.33	32.62	1738.	8.8	55.40	17.26
CELL BIOL CYT & HIST	1855.	1.17	3.10	34.15	32892.	17.7	53.19	16.41
MICROBIOLOGY	1233.	0.86	2.06	25.13	12345.	10.0	54.34	17.39
VIROLOGY	1485.	1.40	2.48	40.74	30308.	20.4	54.17	14.80
PARASITOLOGY	434.	1.01	0.72	29.37	1694.	3.9	53.25	17.88
BIOMEDICAL ENGINRNG	160.	1.09	0.27	31.68	490.	3.1	55.11	17.33
MISC BIOMEDICAL RES	219.	1.09	0.37	31.71	457.	2.1	51.79	15.69
GENRL BIOMEDICAL RES	4804.	0.96	8.01	27.82	115314.	24.0	54.22	16.98

Table 5B

BIBLIOMETRIC PROFILE OF NIH-SUPPORTED RESEARCH, 1977-80*

FIELD/LEVEL	NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
************************ NORMALIZED AGAINST FIELDS [1-2] ************************								
FIELDS [1-2]	64113.	1.00	100.00	27.95	447666.	14.1	54.21	17.37
CLIN MEDICINE [1]	35390.	0.90	55.20	25.22	208123.	11.8	55.68	19.62
BIOMED RESEARCH [2]	28721.	1.15	44.80	32.25	237624.	17.0	53.05	14.88
LEVEL								
CLINICAL-MIX [1-2]	13626.	0.63	21.25	17.69	70005.	9.9	55.86	22.05
CLIN INVESTIGATN [3]	19601.	1.23	30.57	34.51	120121.	12.5	54.78	15.79
BASIC RESEARCH [4]	30882.	1.16	48.17	32.30	254503.	16.9	52.95	14.63
************************ NORMALIZED AGAINST FIELDS [1-9] ************************								
FIELDS [1-9]	65688.	1.00	100.00	27.45	445791.	13.7	54.31	18.03
CLIN MEDICINE [1]	35390.	0.92	53.88	25.22	208123.	11.8	55.68	19.62
BIOMED RESEARCH [2]	28721.	1.17	43.72	32.25	237624.	17.0	53.05	14.88
BIOLOGY [3]	412.	0.48	0.63	13.20	1257.	5.1	52.99	20.96
CHEMISTRY [4]	463.	0.60	0.70	16.58	3114.	10.1	54.05	17.43
PHYSICS [5]	162.	1.41	0.25	38.84	465.	5.9	52.44	14.59
EARTH & SPACE SC [6]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
ENGRNG & TECHNOL [7]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
PSYCHOLOGY [8]	538.	0.55	0.82	15.08	1184.	4.3	54.40	22.18
MATHEMATICS [9]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00

NOTE: CHEMISTRY AND PSYCHOLOGY DATA SHOULD BE TREATED CAUTIOUSLY OVER TIME DUE TO INCONSISTENT DATABASE COVERAGE.

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*BID-SCI journal set citing BID-MEDLINE papers, 1973-80, but does not include citations received by 1979-80 publications. Activity index normalized against Fields 1 and 2. Citation counts scaled within subfield to 1973 equivalents.

Table 5B (Continued)

BIBLIOMETRIC PROFILE OF NIH-SUPPORTED RESEARCH, 1977-80*

FIELD/SUBFIELD	NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
CLIN MEDICINE [1]								
GENRL & INTERNAL MED	4630.	0.86	7.22	24.13	41909.	17.2	57.24	20.31
ALLERGY	177.	1.34	0.28	37.59	720.	8.7	53.55	16.16
ANESTHESIOLOGY	242.	0.64	0.38	17.88	784.	7.1	59.00	25.68
CANCER	4257.	1.59	6.64	44.31	30045.	13.6	52.55	13.07
CARDIOVASCULAR SYSTM	1949.	1.18	3.04	33.04	14874.	15.3	56.08	17.07
DENTISTRY	755.	0.74	1.18	20.75	1612.	4.1	53.11	20.37
DERMAT & VENERL DIS	329.	0.73	0.51	20.40	859.	5.8	55.74	28.49
ENDOCRINOLOGY	2422.	1.29	3.78	36.17	16254.	15.3	58.25	16.18
FERTILITY	232.	0.45	0.36	12.65	654.	5.5	51.51	18.04
GASTROENTEROLOGY	535.	0.96	0.83	26.75	3054.	10.5	63.99	16.35
GERIATRICS	120.	0.38	0.19	10.69	231.	4.5	62.42	26.69
HEMATOLOGY	811.	1.12	1.27	31.29	3048.	8.8	63.15	17.26
IMMUNOLOGY	4271.	1.45	6.66	40.50	34324.	16.1	56.09	14.97
OBSTETRICS & GYNECOL	516.	0.54	0.81	15.19	2147.	8.3	55.32	22.84
NEUROL & NEUROSURG	3831.	0.95	5.97	26.51	23506.	12.2	53.21	13.77
OPHTHALMOLOGY	1126.	1.32	1.76	36.91	3147.	6.1	52.94	15.66
ORTHOPEDICS	97.	0.23	0.15	6.33	174.	5.4	53.36	18.56
ARTHRITIS & RHEUMAT	231.	0.79	0.36	22.14	906.	10.5	54.63	22.93
OTORHINOLARYNGOLOGY	259.	0.47	0.40	13.00	655.	4.2	54.14	18.57
PATHOLOGY	1013.	1.21	1.58	33.69	4001.	8.2	56.55	18.63
PEDIATRICS	1267.	0.86	1.98	24.00	4772.	7.7	55.21	19.89
PHARMACOLOGY	2004.	0.77	3.12	21.55	9003.	9.8	51.11	11.80
PHARMACY	626.	0.72	0.98	20.06	2389.	6.8	54.94	20.27
PSYCHIATRY	131.	0.14	0.20	3.79	582.	8.1	58.15	22.17
RADIOLOGY & NUCL MED	863.	0.54	1.35	15.15	2805.	5.9	51.91	18.00
RESPIRATORY SYSTEM	464.	1.28	0.72	35.71	1882.	8.2	61.36	18.60
SURGERY	1160.	0.45	1.81	12.58	4744.	7.3	54.31	20.21
TROPICAL MEDICINE	137.	0.70	0.21	19.54	361.	4.9	53.61	14.67
UROLOGY	265.	0.39	0.41	10.90	764.	5.2	55.26	21.96
NEPHROLOGY	63.	0.50	0.10	14.11	131.	3.6	48.94	14.93
VETERINARY MEDICINE	297.	0.38	0.46	10.59	505.	3.4	52.57	15.62
ADDICTIVE DISEASES	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
HYGIENE & PUBL HLTH	313.	0.71	0.49	19.92	933.	6.0	60.41	38.63
BIOMED RESEARCH [2]								
PHYSIOLOGY	2714.	1.51	4.23	42.18	18683.	14.7	51.36	12.08
ANATOMY & MORPHOLOGY	371.	1.64	0.58	45.97	1234.	6.2	51.84	17.75
EMBRYOLOGY	502.	1.35	0.78	37.85	2849.	11.5	55.90	15.20
GENETICS & HEREDITY	665.	0.86	1.04	24.04	3099.	9.9	52.45	16.56
NUTRITION & DIETET	614.	0.97	0.96	27.24	2400.	7.7	52.62	14.78
BIOCHEM & MOLEC BIOL	12527.	1.11	19.54	30.93	111233.	18.6	53.40	15.18
BIOPHYSICS	301.	1.20	0.47	33.67	997.	8.1	52.53	13.18
CELL BIOL CYT & HIST	2079.	1.25	3.24	34.82	17959.	17.5	56.39	16.93
MICROBIOLOGY	1090.	0.90	1.70	25.17	4565.	8.8	53.50	15.30
VIROLOGY	1783.	1.52	2.78	42.37	16735.	19.3	61.04	14.33
PARASITOLOGY	318.	0.82	0.50	23.03	734.	3.7	52.23	14.06
BIOMEDICAL ENGINRNG	165.	0.98	0.26	27.35	285.	3.2	55.72	29.26
MISC BIOMEDICAL RES	198.	1.14	0.31	31.98	243.	2.2	51.96	16.57
GENRL BIOMEDICAL RES	5394.	1.14	8.41	31.78	57521.	21.2	53.70	14.73

CROSSCUTTING RESEARCH

Table 6 opens a small window on the breadth of relations between biomedical disciplines and the programmatic interests of NIH. Shown in the table are the clinical medical fields and basic bioscience disciplines that were substantially supported by more than one NIH Institute, as reflected in 1973-76 and 1977-80 publications. Seventy-five papers in either time period is the arbitrary minimum number of papers used here to define substantial involvement. Publication counts for each discipline and BID show changes of research emphasis over time.

For the following 15 other disciplines, only one BID each was substantially involved. The Institute and number of papers in each period, 1973-76/1977-80, are shown parenthetically.

Allergy (NIAID--98/106 papers)
Anesthesiology (NIGMS--230/143 papers)
Cardiovascular System (NHLBI--1,626/1,661 papers)
Dentistry (NIDR--554/574 papers)
Fertility (NICHD--198/160 papers)
Gastroenterology (NIADDK--298/347 papers)
*Geriatrics (NICHD + NIA--71 + 17/13 + 67 papers)
Ophthalmology (NEI--995/994 papers)
Arthritis and Rheumatism (NIADDK--109/127 papers)
Otorhinolaryngology (NINCDS--345/159 papers)
Respiratory System (NHLBI--253/347 papers)
Tropical Medicine (NIAID--120/108 papers)
Hygiene and Public Health (NHLBI--49/81 papers)
Anatomy and Morphology (NICHD--88/83 papers)
Parasitology (NIAID--352/231 papers)

The fields and disciplines that have been most widely influenced by NIH programmatic interests--i.e., four or more of the Institutes supported a substantial number of papers--are as follows:

General and Internal Medicine
Cancer
Endocrinology
Immunology
Neurology and Neurosurgery
Pathology
Pediatrics

Pharmacology
Surgery
Physiology
Biochemistry and Molecular Biology
Cell Biology, Cytology, and Histology
Microbiology

Not surprisingly, all the BIDs supported a substantial number of papers in the subfield Biochemistry and Molecular Biology.

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*Following the creation of NIA in 1974, most of the Geriatrics research formerly sponsored by NICHD was subsequently transferred to the new Institute. Hence, publication counts in this subfield for NIA and NICHD are presented together here.

Table 6

CROSSCUTTING BIOMEDICAL SUBFIELDS
Number of BID-Supported Papers During 1973-76 and 1977-80*

Subfields	NCI	NEI	NHLBI	NIAID	NIADDK	NICHD	NIDR	NIGMS	NINCDS	NIA**	NIEHS
Gen. & Int. Medicine	707 688	-	1253 1184	570 404	1264 1068	311 221	-	372 254	138 110	-	-
Cancer	3062 3680	-	-	85 63	81 79	-	-	104 84	-	-	-
Dermat. & VD	81 61	-	-	-	186 144	-	-	-	-	-	-
Endocrinology	135 179	-	128 173	-	890 928	605 622	-	-	79 65	-	-
Hematology	136 262	-	234 285	-	134 102	-	-	-	-	-	-
Immunology	811 1344	-	151 220	1563 1685	343 325	72 91	75 58	163 159	44 77	-	-
Obstetrics & Gynecology	67 81	-	-	-	-	191 206	-	-	-	-	-
Neurology & Neurosurgery	-	373 548	66 84	-	56 82	226 241	-	206 201	2078 2178	-	-
Pathology	189 227	-	258 277	-	173 158	-	-	79 42	-	-	-
Pediatrics	78 96	-	115 227	100 97	155 159	302 315	-	59 74	-	-	-
Pharmacology	204 263	-	311 398	-	165 175	80 77	-	373 377	253 250	-	168 235
Pharmacy	224 262	-	-	-	-	-	-	119 133	-	-	-

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*Counts shown only if two or more BIDs had at least 75 papers each in the subfield in either period.

**NIA was created in 1974 and had few papers during 1973-76.

Table 6

CROSSCUTTING BIOMEDICAL SUBFIELDS (continued)
Number of BID-Supported Papers During 1973-76 and 1977-80*

Subfields	NCI	NEI	NHLBI	NIAID	NIADDK	NICHD	NIDR	NIGMS	NINCDS	NIA**	NIEHS
Radiology & Nucl. Medicine	315 364	-	153 181	-	-	-	-	222 153	-	-	-
Surgery	179 146	-	502 397	-	315 235	-	-	205 174	-	-	-
Urology	66 100	-	-	-	80 178	-	-	-	-	-	-
Physiology	-	81 119	853 1219	-	196 568	85 121	-	158 155	328 265	-	-
Embryology	-	-	-	-	-	179 162	-	86 99	-	-	-
Genetics & Heredity	81 137	-	-	-	-	-	-	330 288	-	-	-
Nutrition & Diet	-	-	-	-	180 227	63 84	-	-	-	-	-
Biochem. & Molec. Biol.	1733 2136	97 136	1349 1836	602 532	2506 2458	716 649	135 146	2731 3136	519 430	13 95	82 129
Cell Biol. Cyto. & Hist.	485 605	-	133 170	81 60	227 305	184 127	86 64	353 370	145 138	-	-
Microbiology	95 90	-	-	399 289	105 62	-	-	447 488	-	-	-
Virology	683 1047	-	-	458 419	-	-	-	180 180	-	-	-

PART II. NIH INTRAMURAL PROGRAM

Part I of this report presented a bibliometric analysis of all NIH-supported publications--intramural and extramural. This section focuses on the publications resulting from the NIH Intramural Research Program.

This program yields approximately 10 percent of all NIH-supported publications, varying across the individual BIDs. Funding for these programs as a percent of the BID's total budget ranges from less than 1 for NIGMS to nearly 30 for NIEHS. Table 7 presents obligations data for the individual Institutes.

The other tables and figures in this part of the report parallel those in Part I.

Table 7

Allocation of Individual BIDs' Fiscal 1980 Obligations to the Intramural Research Program*
(Dollars in Thousands)

BID	Total Obligations	Intramural Research	Percent
NIA	$ 69,687	$ 12,670	18.2%
NIAID	214,657	37,108	17.3
NIADDK	340,131	40,387	11.9
NCI	998,047	144,009	14.4
NICHD	208,346	21,593	10.4
NIDR	67,600	13,039	19.3
NIEHS	83,637	24,897	29.8
NEI	109,603	10,192	9.3
NIGMS	312,339	515	0.2
NHLBI	527,091	39,040	7.4
NINCDS	241,353	34,473	14.3

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*Data from "Basic Data Relating to the National Institutes of Health, 1981," NIH Publication No. 81-1261, May 1981, pp. 12-17.

INTRAMURAL FUNDING AND PUBLICATION TRENDS

As in the NIH overall program, analysis of intramural data reveals a strong association of funding and publication trends. The correlation between intramural research obligations in constant (fiscal 1969) dollars, 1967-77, and numbers of research papers published three years later (Fields 1-9) proved substantial: r = .93. The two series are as follows:

Fiscal Year	Constant $ (Thousands)	Fiscal Year	No. of Papers
1967	$ 95,231	1970	1,285
1968	100,425	1971	1,326
1969	104,473	1972	1,417
1970	102,640	1973	1,348
1971	116,250	1974	1,379
1972	118,408	1975	1,427
1973	120,518	1976	1,462
1974	127,417	1977	1,542
1975	137,786	1978	1,598
1976	143,320	1979	1,766
1977	160,089	1980	1,672*

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*Approximately 5 percent short of total papers.

INTRAMURAL PUBLICATION ACTIVITY

A research-level profile of papers derived from the NIH Intramural Research Program (IRP) is presented in Table 8, and publication profiles showing the areas of NIH IRP research emphasis are presented in Figures 11A, 11B, 12A, and 12B. These figures are constructed directly from the data in Tables 9A and B.

Research-Level Profile

Table 8 presents the level classification of the NIH IRP publications for two time periods, 1973-76 and 1977-80. There was a decrease in the percent, but not the number, of IRP papers at the more clinical levels (Levels 1 and 2) and an increase in the number and percent of IRP papers at the more basic levels--Clinical Investigation (Level 3) and Basic Research (Level 4). These trends closely parallel those noted in the total NIH supported papers (intramural and extramural) in Table 3.

Table 8

Number and Percent of NIH Intramural Research Papers
According to Level, 1973-76 and 1977-80

Level	1973-76		1977-80*	
Levels 1 & 2 (Clinical Observation & Clinical Mix)	1,209	22%	1,273	19%
Level 3 (Clinical Investigation)	1,887	34	2,300	35
Level 4 (Basic Research)	2,425	44	3,020	46
Total	5,521	100%	6,593	100%

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*1980 data include a 5 percent estimate for 1980 papers appearing on 1981 SCI tapes.

Publication Counts

Figures 11A and 11B show the percent of all papers in clinical medicine and biomedical research, respectively, in the BID-MEDLINE journal set that were supported by NIH. For each subfield, the two sets of bars represent NIH-supported papers as a percent of all papers in the subfield, 1973-76 and 1977-80. All papers acknowledging NIH support, intramural or extramural, are indicated by the total bar; those acknowledging IRP support, by the dark portion.

The areas in which NIH plays the largest role--i.e., greatest relative emphasis--are Cancer, Immunology, and Virology. This emphasis reflects the large roles of the National Cancer Institute and the National Institute of Allergy and Infectious Diseases, the first in all three areas and the second in Immunology and Virology. The IRP as well as NIH altogether is a major force in these three subfields.

Activity Indexes

Figures 12A and 12B show the activity index distribution for the IRP at the two periods 1973-76 and 1977-80. A fuller description of the activity index is provided on page 16.

The IRP activity index in Cancer, at 3.3 for 1973-76 and 2.8 for 1977-80 (or 3.3 and 2.8 times the "expected" level, given the size of the IRP and the size of the field), is the program's subfield of greatest relative emphasis. Note that the index for Cancer declined in the second period, though the number of IRP papers in the subfield actually increased. This is because the subfield grew faster than the IRP participation.

The IRP's activity indexes are high in the subfields of Immunology and Virology. During 1977-80 the IRP increased its absolute and relative activity in these areas.

The indexes are also high for certain subfields, represented by open bars, that contained very few of the papers acknowledging IRP support, such as Tropical Medicine, Embryology, and Miscellaneous Biomedical Research. While NIH does not emphasize these subfields, the research is important to sustain and advance areas not attractive to many investigators.

Figure 11A

NIH Intramural and Total NIH

Percent of All Papers in Each Subfield of Clinical Medicine

240 BID–MEDLINE Journals

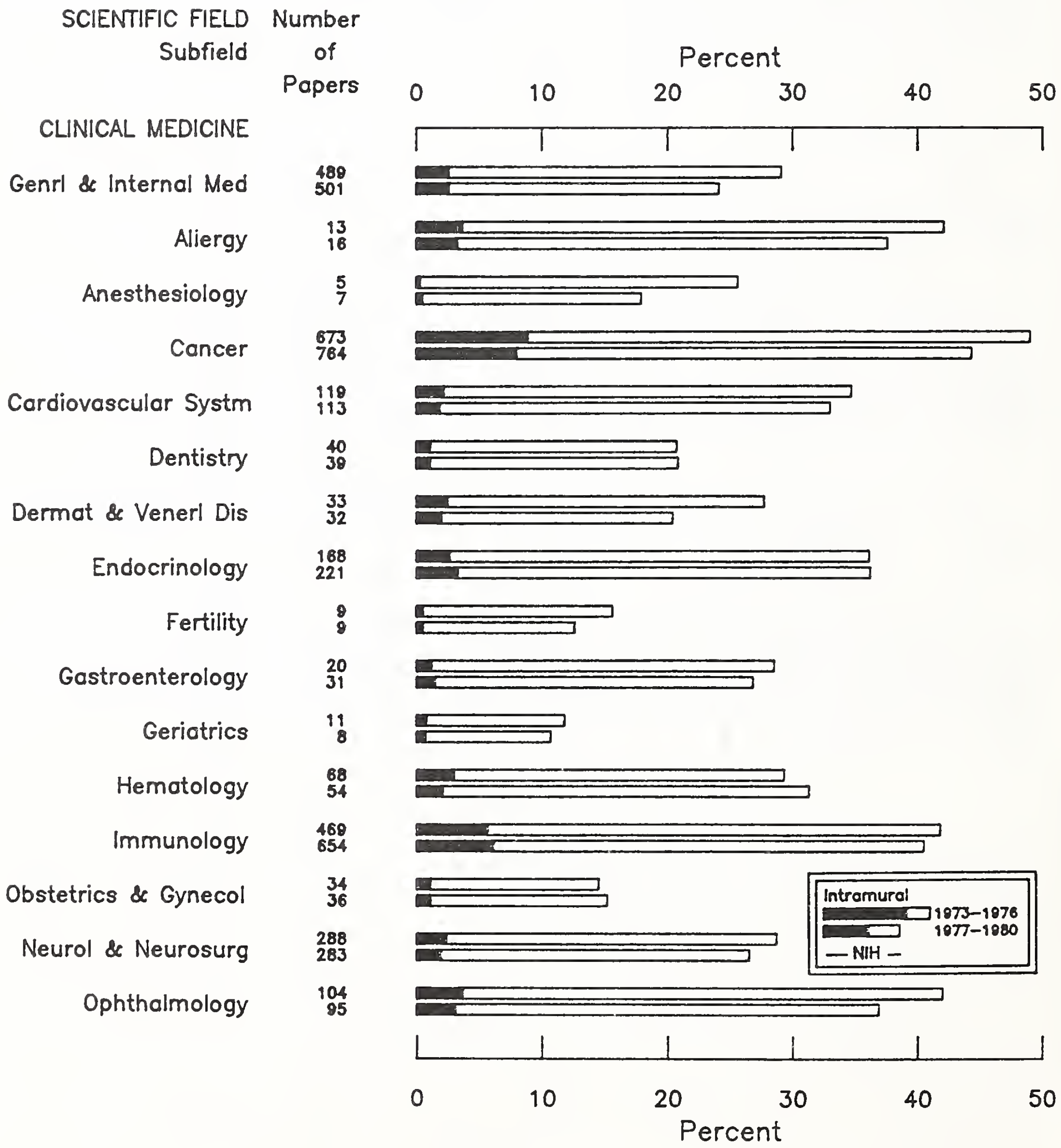


Figure 11A (Continued)

NIH Intramural and Total NIH

Percent of All Papers in Each Subfield of Clinical Medicine

240 BID-MEDLINE Journals

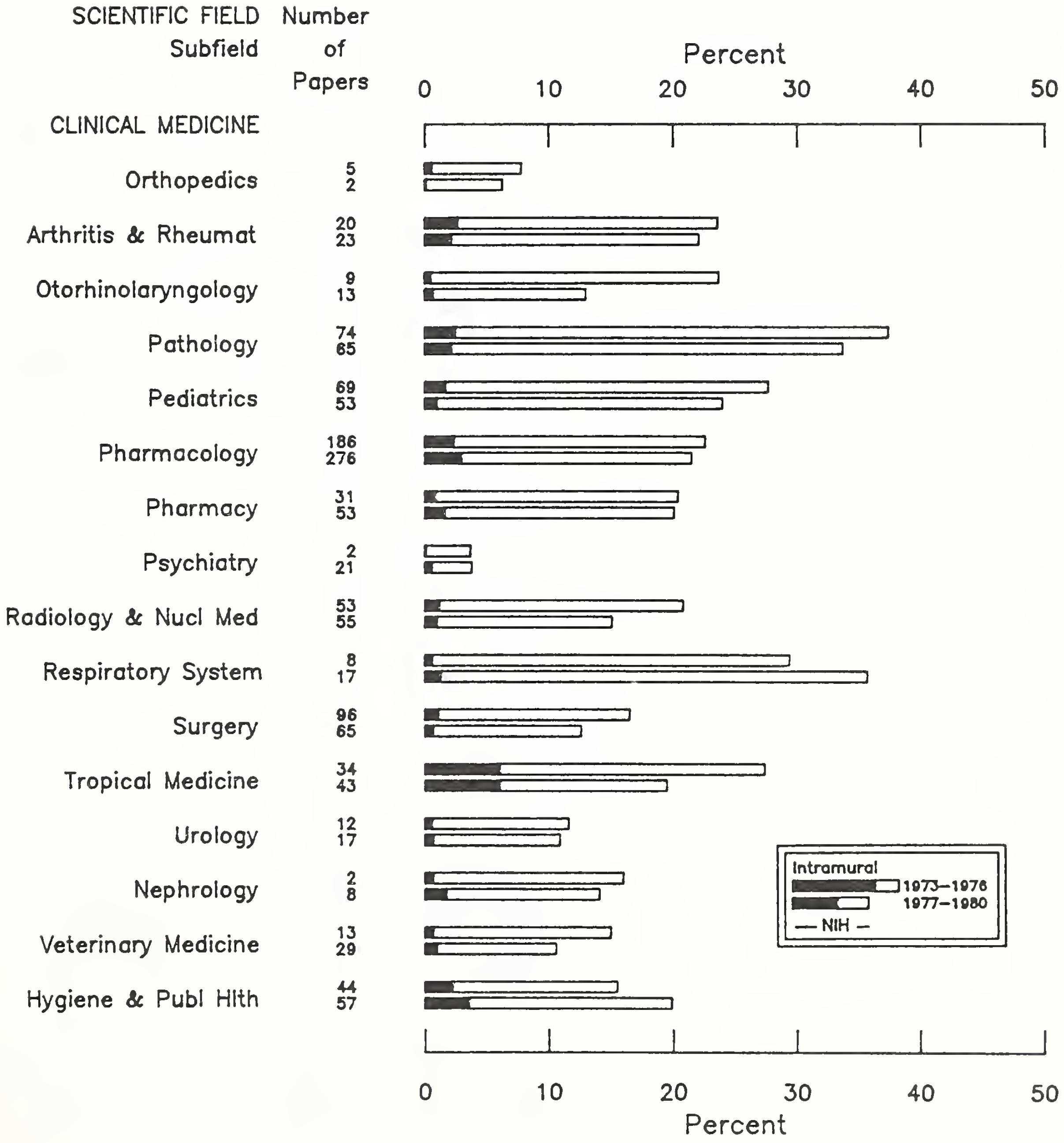


Figure 11B

NIH Intramural and Total NIH

Percent of All Papers in Each Subfield of Biomedical Research

240 BID–MEDLINE Journals

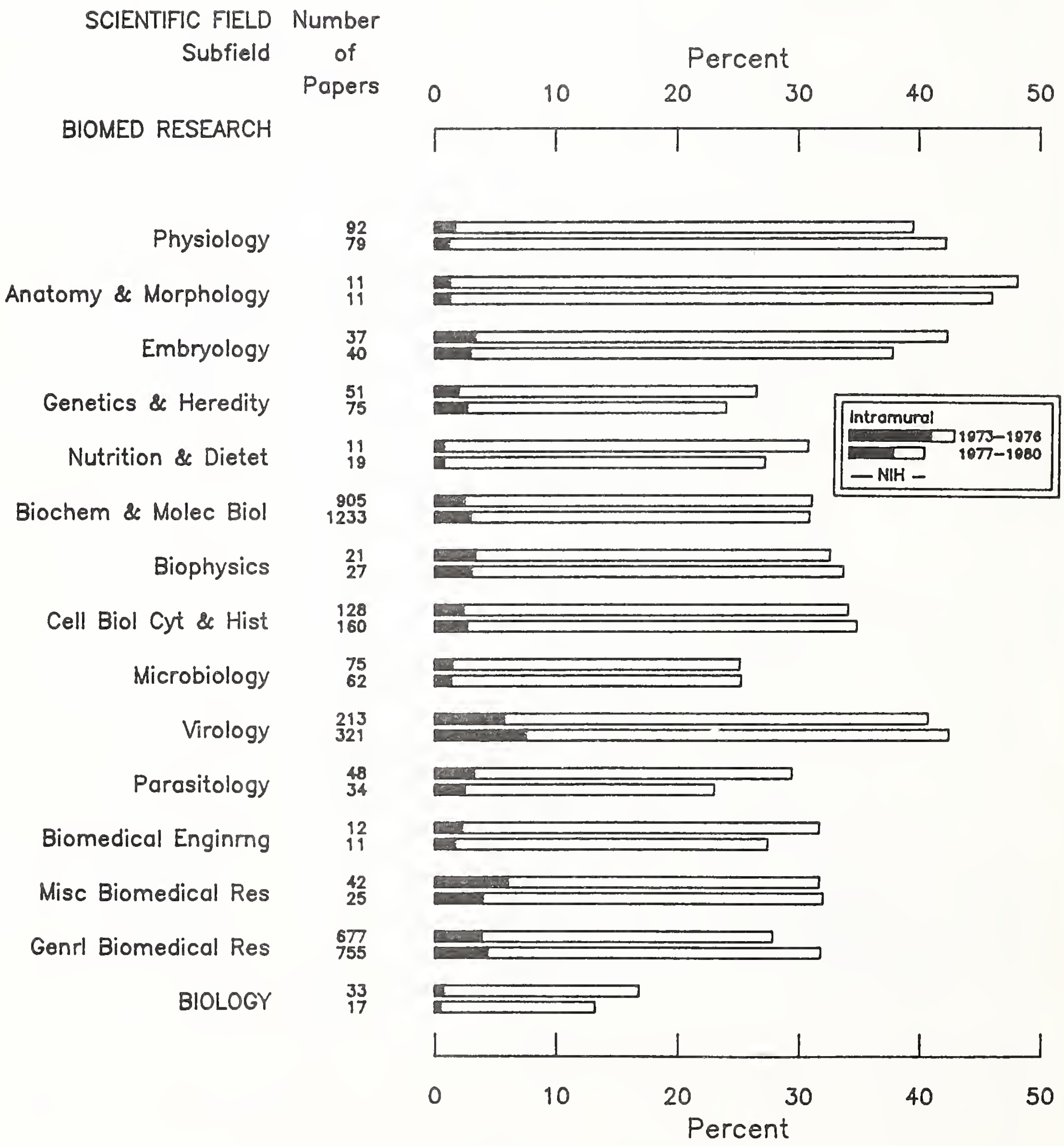
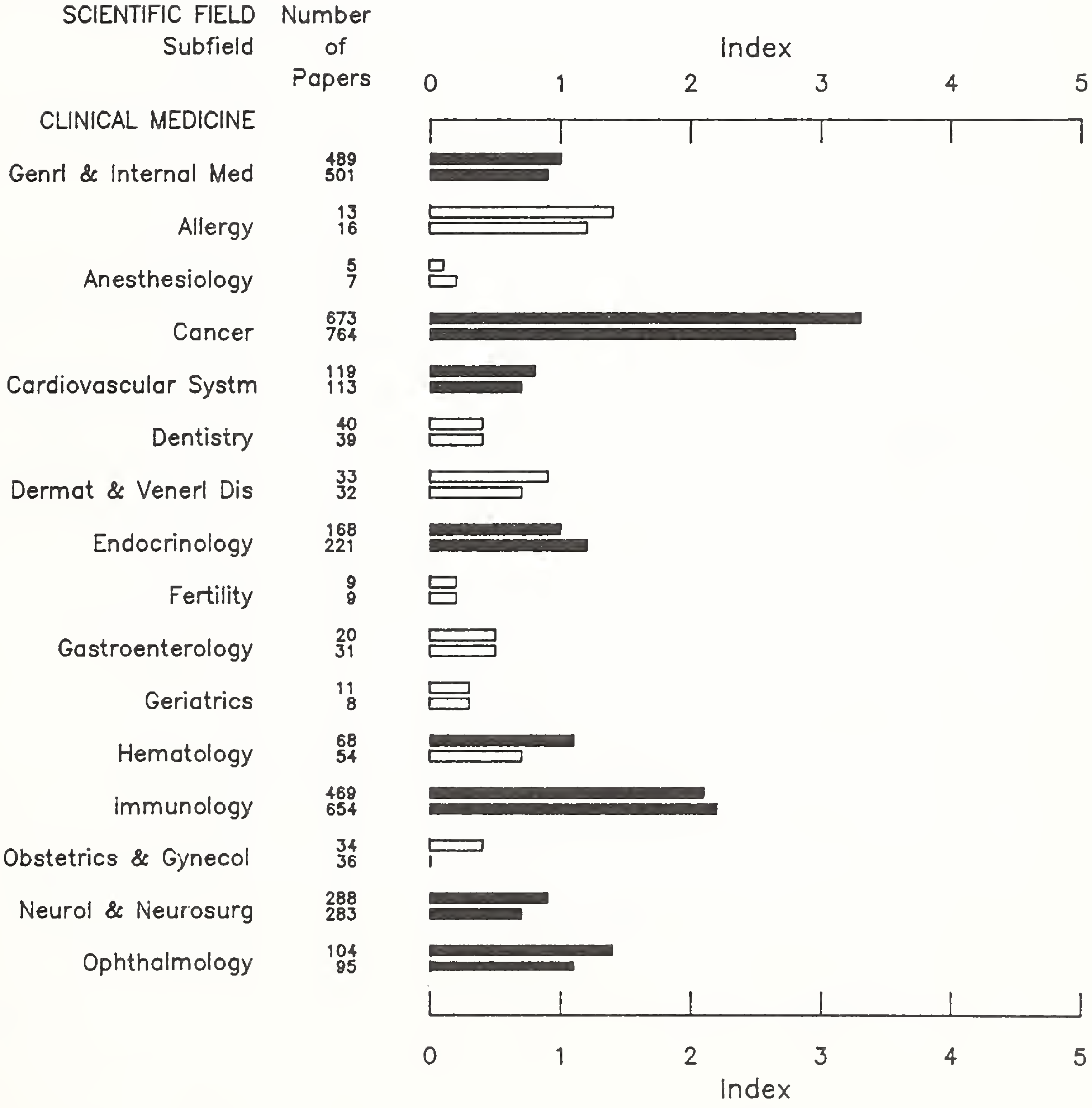


Figure 12A

NIH Intramural Activity Indexes in Subfields of Clinical Medicine

240 BID–MEDLINE Journals
1973–1976 over 1977–1980

$$\text{INDEX} = \frac{\text{\% of Institute's Papers in Subfield}}{\text{\% of 240 Journals' Papers in Subfield}}$$



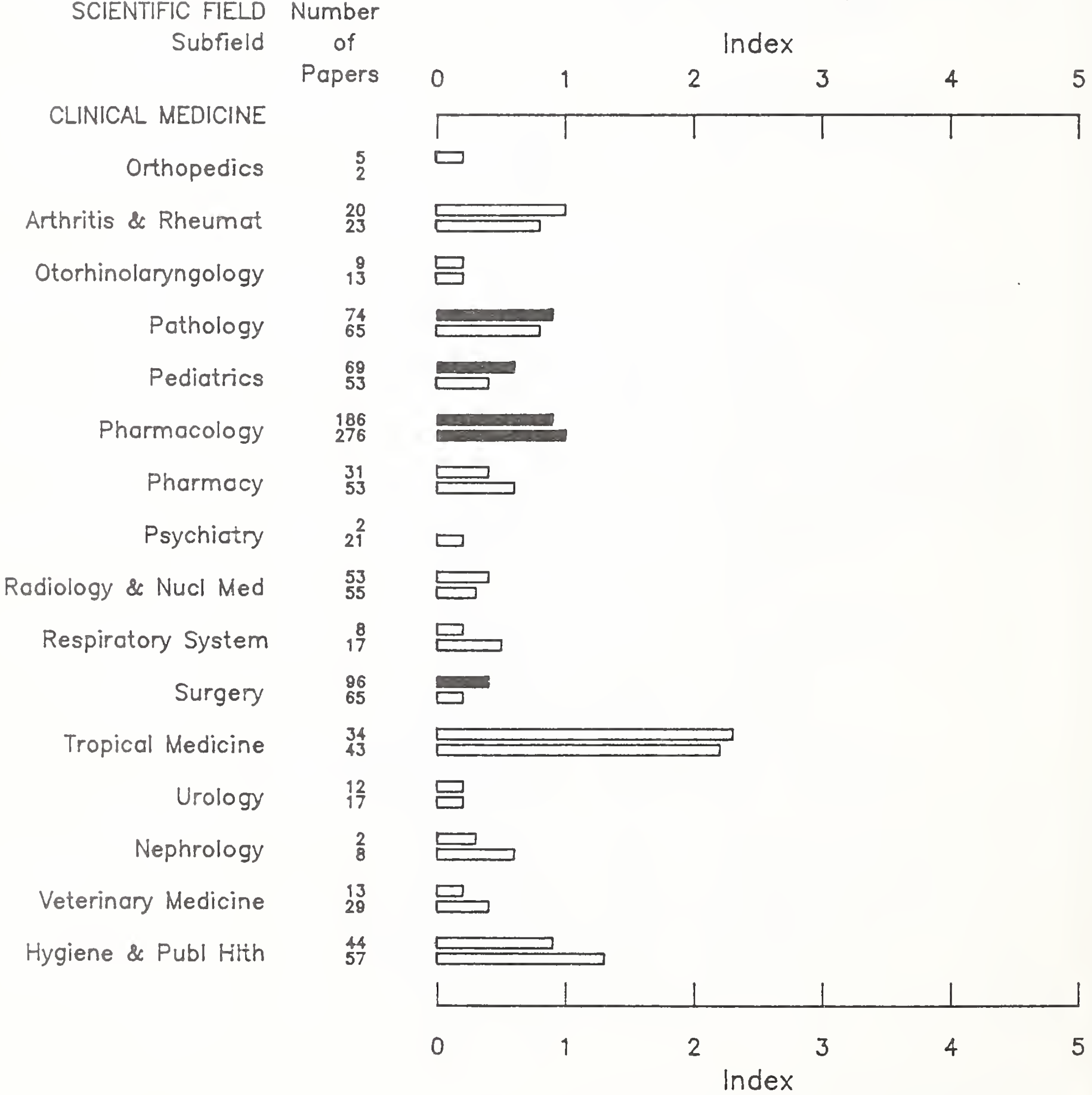
Note: Open bars designate subfields that contained less than 1 percent of the papers by intramural NIH authors in the given period.

Figure 12A (Continued)

NIH Intramural Activity Indexes in Subfields of Clinical Medicine

240 BID–MEDLINE Journals
1973–1976 over 1977–1980

$$\text{INDEX} = \frac{\text{\% of Institute's Papers in Subfield}}{\text{\% of 240 Journals' Papers in Subfield}}$$



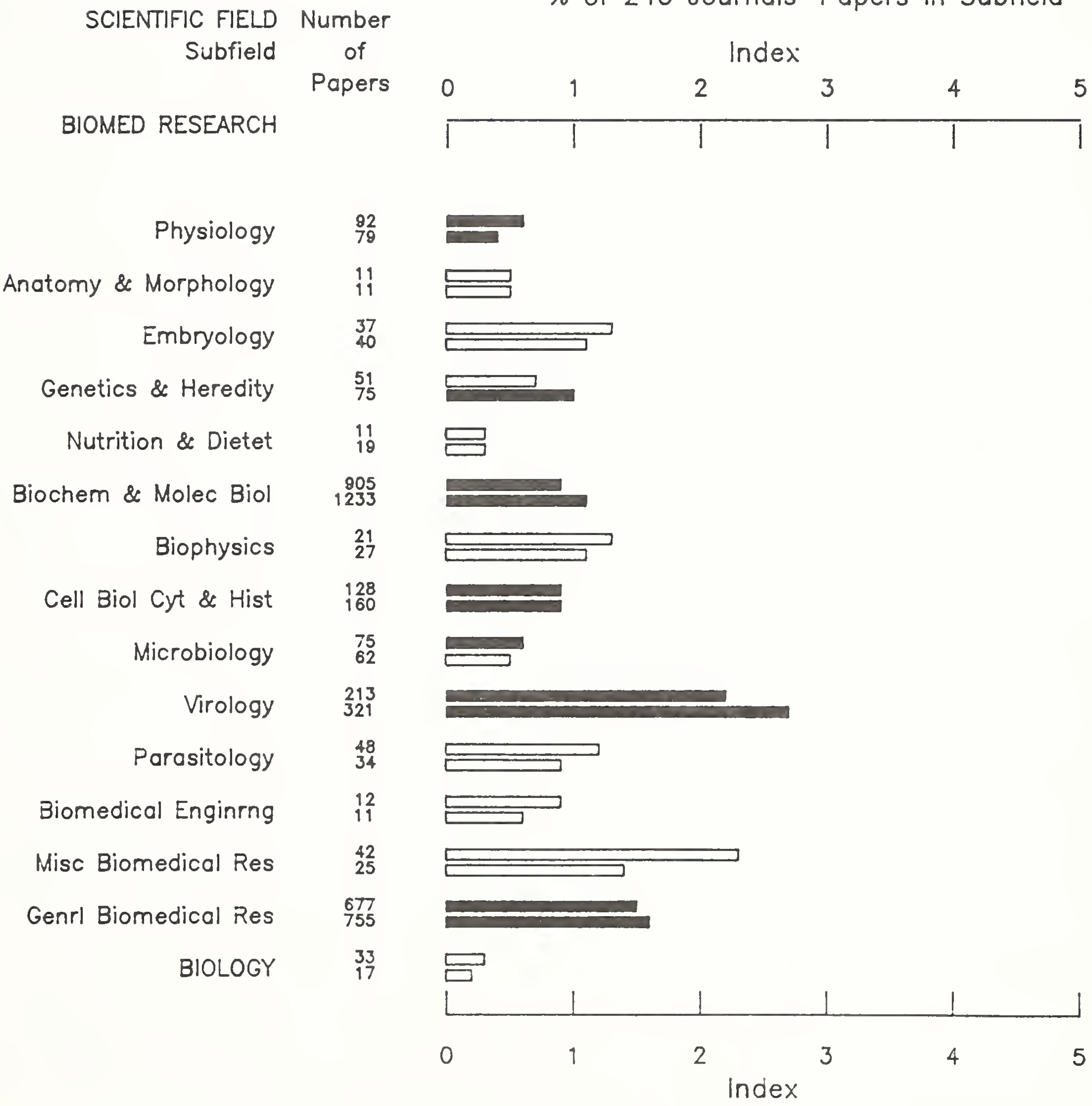
Note: Open bars designate subfields that contained less than 1 percent of the papers by intramural NIH authors in the given period.

Figure 12B

NIH Intramural Activity Indexes in Subfields of Biomedical Research

240 BID-MEDLINE Journals
1973-1976 over 1977-1980

$$\text{INDEX} = \frac{\text{\% of Institute's Papers in Subfield}}{\text{\% of 240 Journals' Papers in Subfield}}$$



Note: Open bars designate subfields that contained less than 1 percent of the papers by intramural NIH authors in the given period.

CITATION PERFORMANCE OF INTRAMURAL PAPERS

It is widely accepted within the research community that high citation rates are associated with quality research, especially when

- statistically meaningful numbers of papers are under scrutiny, and

- adequate normalization is supplied, to take account of differences between citation density in different subfields and periods.

Also widely accepted is the view that the very highly cited papers play a particularly important role in research advance.

Within the 240-journal database,

- 26.1 percent of the NIH intramural papers are in the top citation decile,

- 16.3 percent of NIH-supported extramural papers are in this decile,

- 11.7 percent of all other U.S.-supported papers are in the decile, and

- only 3.9 percent of the U.S. papers that do not acknowledge support are in the decile.

A paper is placed in the top citation decile if it is cited at least as frequently as the most frequently cited 10 percent of all papers in the field or subfield. For example, if 11 percent of the papers in a subfield are cited more than five times in a given year, then any paper cited more than five times in that year would be considered a "top decile" paper. Since citation counts are integer, the top decile always contains slightly more than 10 percent of the papers. For example, 10.64 percent of the papers in the entire database taken together are in the top decile.

The outstanding performance of the NIH intramural program is clearly apparent. More than two and one-half times as many NIH intramural papers are in the top 10 percent of cited papers in biomedicine as one would expect. Also, the citation performance of the NIH-supported extramural papers is excellent, with 60 percent more papers in the top decile then one would expect.

At the other end of the citation spectrum are the papers designated U.S. unacknowledged support--papers that did not have any kind of research support acknowledgement. These are usually clinical observation papers, written by a physician or other scientist without any outside funding. Only one-third as many of these are in the top decile, an indication that they are generally not in the mainstream of biomedical research.

Subfield Basis

The outstanding intramural publication record is not confined to any one subfield, but is virtually across the board. High citation counts are found in all the subfields in which NIH intramural papers are published. Before discussing the subfield results, a subtle point about the data should be clarified.

When top decile is defined on a subfield-by-subfield basis, the citation cutoff is different in each subfield. As a result, the average top decile percentages are slightly different from the ones previously given for all subfields combined. Specifically, within the 240 biomedical journals in our BID-MEDLINE database, on a subfield-by-subfield basis,

- 21.9 percent of the NIH intramural papers are in the top citation deciles of their subfields,
- 15.3 percent of the NIH-supported extramural papers are in these top citation deciles,
- 12.4 percent of all U.S.-authored and U.S.-supported papers are in these deciles, and
- only 7.3 percent of the U.S. papers with support unacknowledged are in these deciles.

The fact that the NIH intramural performance is not quite as high on a subfield-by-subfield basis, and the support-unacknowledged performance not quite as poor, are results of an interesting aspect of the data: NIH intramural papers are being published in the most highly cited subfields; the support-unacknowledged papers, in the least highly cited. As a result, a subfield-by-subfield comparison, while catching the breadth of the NIH performance, tends to underestimate the impact of these papers on biomedicine as a whole.

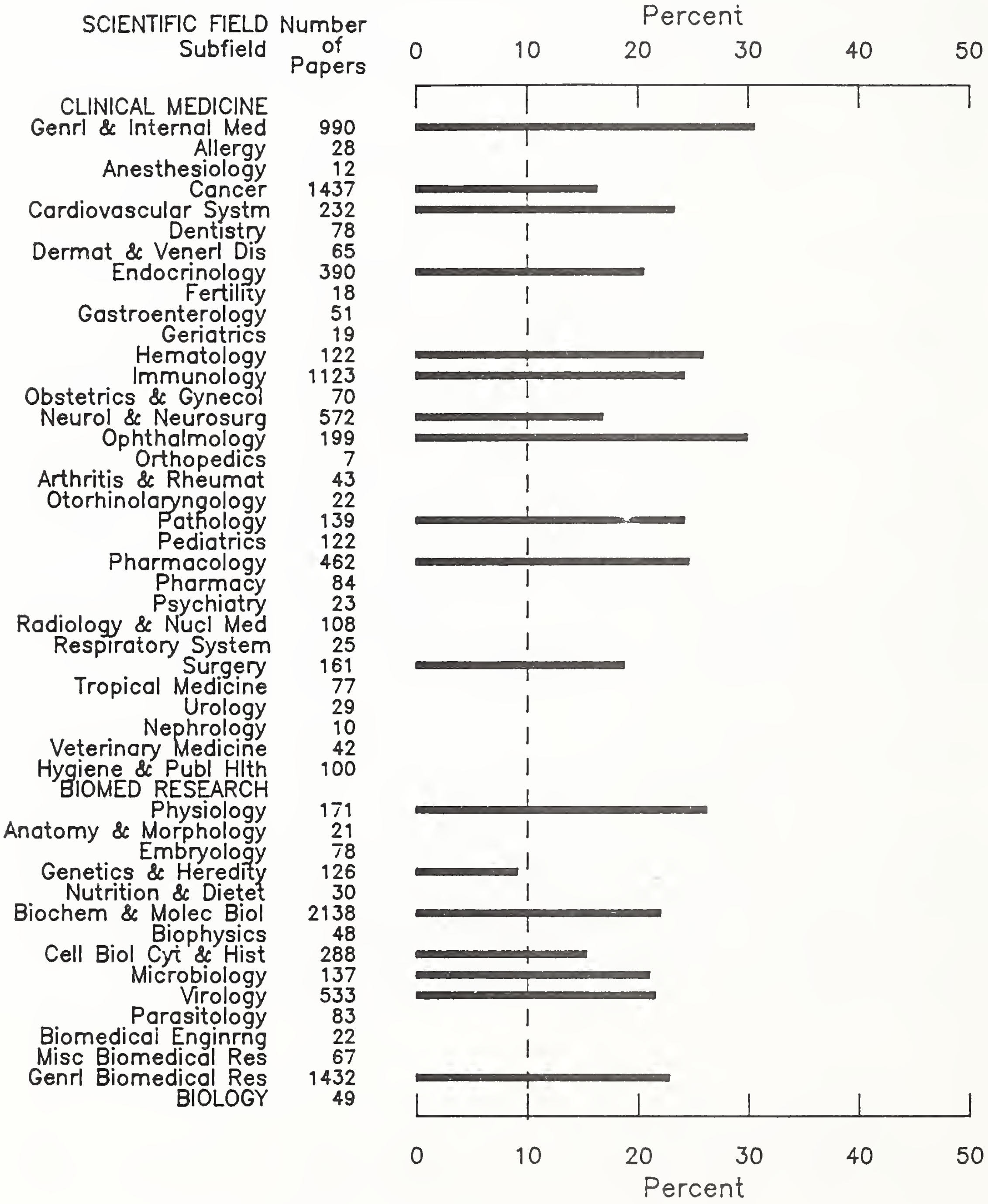
Figure 13 presents citation performance data for NIH intramural program publications subfield by subfield.

There are 18 biomedical subfields in which the NIH intramural program publishes more than one percent of its papers. In 17 of these subfields, substantially more than 10 percent of the papers are in the top decile. In only one subfield--Genetics and Heredity--is this not quite true. In the other 17 subfields, 15 percent or more of the NIH intramural papers are in the top decile, and in General and Internal Medicine and Ophthalmology, an almost incredible 30 percent of the NIH intramural papers are in the top decile of cited papers.

Figure 13

NIH Intramural

Percent of BID's Papers in Top Decile of Cited Papers
1973–1980 Papers in 240 BID–MEDLINE Journals



NOTE: No values shown for scientific subfields with less than 1 percent of papers for this BID.

INTRAMURAL PUBLICATION PROFILE

Just as Tables 5A and B presented bibliometric data for all NIH programs, Tables 9A and B are profiles of the bibliometric activity of the NIH Intramural Research Program (IRP).* Table 9A counts all papers published in the 240 BID-MEDLINE journal set in the years 1973-76 and counts citations received by these papers from the 275-journal set from 1973 through 1980. Table 9B is a profile of the NIH IRP for the period 1977-80.

The first page of each table presents the data for all fields combined, for each research level, and for each of the major fields. The second page lists the individual subfields of clinical medicine and biomedical research. The column headings, as in Tables 5A and B, are defined as follows:

1. Number of Papers - The fractional number of papers supported by this BID in the particular level, field, and subfield (L/F/S).

2. Activity Index - Proportion of the BID's papers in the L/F/S divided by the proportion of all papers in the BID-MEDLINE journal set in that L/F/S.

3. % Internal Effort - Percent of the BID's papers in the particular L/F/S.

4. % External Effort - Percent of all papers in the BID-MEDLINE journal set in the particular L/F/S that were supported by this BID.

5. Total Cites - Total citations (from all journals in the BID-MEDLINE set for citing years 1973-80) received by the papers supported by this BID in the particular L/F/S. Scaled to the average citation rate for each L/F/S in 1973.

6. Cites per Paper - Total scaled citations received by this BID's papers in a given L/F/S, divided by the number of papers supported.

7. Cite T-Score - This BID's average citations per paper minus the average citations per paper for all papers in the particular L/F/S, divided by the standard deviation of citations per paper for all papers in that L/F/S. The statistic is scaled to a mean of 50 and a standard deviation of 10.

8. % Papers Among the Top 10% - Percent of this BID's papers in the particular L/F/S that are among the 10 percent most highly cited papers in that L/F/S.

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*Again, the data are likely to be unstable when based on aggregates of less than 25. Because of skewness of citation distributions, a sample size of 20 is required to achieve a 95 percent confidence interval of ±2 citations.

Table 9A

BIBLIOMETRIC PROFILE OF NIH INTRAMURAL RESEARCH, 1973-76*

FIELD/LEVEL		NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
************************ NORMALIZED AGAINST FIELDS [1-2] ************************									
FIELDS [1-2]		5521.	1.00	100.00	2.68	104466.	18.9	56.86	23.73
CLIN MEDICINE	[1]	3198.	0.96	57.93	2.58	48973.	15.3	59.42	25.78
BIOMED RESEARCH	[2]	2323.	1.06	42.07	2.83	55597.	23.9	55.88	23.89
LEVEL									
CLINICAL-MIX	[1-2]	1209.	0.66	21.89	1.77	15642.	12.9	60.95	27.08
CLIN INVESTIGATN	[3]	1887.	1.40	34.18	3.76	30751.	16.3	58.19	22.52
BASIC RESEARCH	[4]	2425.	1.03	43.93	2.77	58043.	23.9	55.88	23.54
************************ NORMALIZED AGAINST FIELDS [1-9] ************************									
FIELDS [1-9]		5616.	1.00	100.00	2.53	104955.	18.7	57.23	24.93
CLIN MEDICINE	[1]	3198.	1.02	56.95	2.58	48973.	15.3	59.42	25.78
BIOMED RESEARCH	[2]	2323.	1.12	41.36	2.83	55597.	23.9	55.88	23.89
BIOLOGY	[3]	33.	0.28	0.58	0.71	168.	5.1	52.83	19.29
CHEMISTRY	[4]	49.	0.53	0.87	1.34	573.	11.7	57.39	23.13
PHYSICS	[5]	1.	0.09	0.02	0.23	1.	1.0	40.80	0.00
EARTH & SPACE SC	[6]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
ENGRNG & TECHNOL	[7]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
PSYCHOLOGY	[8]	12.	0.07	0.21	0.17	44.	3.6	52.58	25.00
MATHEMATICS	[9]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00

NOTE: CHEMISTRY AND PSYCHOLOGY DATA SHOULD BE TREATED CAUTIOUSLY OVER TIME DUE TO INCONSISTENT DATABASE COVERAGE.

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*BID-SCI journal set citing BID-MEDLINE papers, 1973-80. Activity index normalized against Fields 1 and 2. Citation counts scaled within subfield to 1973 equivalents.

Table 9A (Continued)

BIBLIOMETRIC PROFILE OF NIH INTRAMURAL RESEARCH, 1973-76*

FIELD/SUBFIELD	NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
CLIN MEDICINE [1]								
GENRL & INTERNAL MED	489.	0.98	8.85	2.63	10830.	22.2	64.08	30.21
ALLERGY	13.	1.38	0.23	3.69	87.	6.8	48.82	7.79
ANESTHESIOLOGY	5.	0.13	0.09	0.35	9.	1.8	44.76	0.00
CANCER	673.	3.32	12.19	8.91	9975.	14.8	53.38	15.48
CARDIOVASCULAR SYSTM	119.	0.81	2.16	2.17	2262.	19.0	59.42	20.95
DENTISTRY	40.	0.42	0.72	1.13	189.	4.8	55.88	22.27
DERMAT & VENERL DIS	33.	0.94	0.60	2.51	207.	6.3	60.45	27.14
ENDOCRINOLOGY	168.	1.00	3.05	2.67	2721.	16.2	57.66	16.93
FERTILITY	9.	0.18	0.16	0.47	51.	5.7	52.36	16.67
GASTROENTEROLOGY	20.	0.45	0.36	1.21	297.	15.0	67.70	26.05
GERIATRICS	11.	0.28	0.19	0.76	37.	3.5	57.18	23.81
HEMATOLOGY	68.	1.13	1.23	3.02	878.	12.9	61.19	30.07
IMMUNOLOGY	469.	2.11	8.49	5.66	10552.	22.5	58.43	23.51
OBSTETRICS & GYNECOL	34.	0.40	0.61	1.08	285.	8.4	55.46	21.67
NEUROL & NEUROSURG	288.	0.90	5.22	2.42	3683.	12.8	52.48	15.55
OPHTHALMOLOGY	104.	1.37	1.89	3.67	949.	9.1	61.11	31.68
ORTHOPEDICS	5.	0.22	0.09	0.60	26.	5.4	54.90	20.69
ARTHRITIS & RHEUMAT	20.	1.01	0.36	2.72	272.	13.6	68.72	27.50
OTORHINOLARYNGOLOGY	9.	0.17	0.16	0.45	23.	2.6	49.63	16.98
PATHOLOGY	74.	0.95	1.33	2.53	778.	10.6	60.03	26.30
PEDIATRICS	69.	0.62	1.24	1.67	591.	8.6	58.62	21.65
PHARMACOLOGY	186.	0.90	3.37	2.42	3085.	16.6	58.31	25.72
PHARMACY	31.	0.38	0.56	1.02	236.	7.7	56.54	14.59
PSYCHIATRY	2.	0.02	0.04	0.07	23.	10.8	62.80	23.08
RADIOLOGY & NUCL MED	53.	0.45	0.95	1.21	313.	5.9	52.36	12.03
RESPIRATORY SYSTEM	8.	0.23	0.14	0.61	158.	19.7	72.20	60.42
SURGERY	96.	0.40	1.74	1.06	630.	6.6	53.41	17.91
TROPICAL MEDICINE	34.	2.28	0.62	6.12	157.	4.6	53.53	19.12
UROLOGY	12.	0.21	0.21	0.56	60.	5.1	55.26	23.94
NEPHROLOGY	2.	0.26	0.04	0.69	30.	14.9	73.07	50.00
VETERINARY MEDICINE	13.	0.25	0.24	0.66	47.	3.6	53.26	22.78
ADDICTIVE DISEASES	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
HYGIENE & PUBL HLTH	44.	0.85	0.79	2.28	245.	5.6	59.39	21.84
BIOMED RESEARCH [2]								
PHYSIOLOGY	92.	0.64	1.66	1.71	2090.	22.8	58.17	26.23
ANATOMY & MORPHOLOGY	11.	0.49	0.19	1.30	37.	3.5	45.59	0.00
EMBRYOLOGY	37.	1.27	0.68	3.41	584.	15.6	59.45	20.09
GENETICS & HEREDITY	51.	0.74	0.93	1.98	459.	8.9	50.01	9.09
NUTRITION & DIETET	11.	0.29	0.20	0.77	79.	7.1	51.95	18.18
BIOCHEM & MOLEC BIOL	905.	0.93	16.38	2.50	22443.	24.8	54.72	22.92
BIOPHYSICS	21.	1.28	0.38	3.43	174.	8.3	54.29	19.20
CELL BIOL CYT & HIST	128.	0.88	2.32	2.36	2462.	19.2	54.11	13.12
MICROBIOLOGY	75.	0.57	1.35	1.52	715.	9.6	53.69	20.76
VIROLOGY	213.	2.18	3.85	5.83	6179.	29.1	62.62	24.92
PARASITOLOGY	48.	1.22	0.88	3.27	185.	3.8	52.99	15.52
BIOMEDICAL ENGINRNG	12.	0.88	0.21	2.35	58.	4.9	64.78	36.62
MISC BIOMEDICAL RES	42.	2.29	0.77	6.14	80.	1.9	50.62	12.99
GENRL BIOMEDICAL RES	677.	1.46	12.27	3.92	19784.	29.2	57.10	22.81

Table 9B

BIBLIOMETRIC PROFILE OF NIH INTRAMURAL RESEARCH, 1977-80*

FIELD/LEVEL	NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
*********************** NORMALIZED AGAINST FIELDS [1-2] ***********************								
FIELDS [1-2]	6510.	1.00	100.00	2.84	60065.	19.4	59.53	26.94
CLIN MEDICINE [1]	3660.	0.92	56.22	2.61	28783.	16.2	62.05	29.41
BIOMED RESEARCH [2]	2850.	1.13	43.78	3.20	31077.	23.3	58.46	24.13
LEVEL								
CLINICAL-MIX [1-2]	1258.	0.58	19.33	1.63	8892.	13.7	61.46	29.72
CLIN INVESTIGATN [3]	2272.	1.41	34.90	4.00	18503.	17.4	62.06	25.93
BASIC RESEARCH [4]	2980.	1.10	45.77	3.12	32355.	23.2	58.49	23.80
*********************** NORMALIZED AGAINST FIELDS [1-9] ***********************								
FIELDS [1-9]	6577.	1.00	100.00	2.75	59326.	18.9	59.79	28.05
CLIN MEDICINE [1]	3660.	0.95	55.65	2.61	28783.	16.2	62.05	29.41
BIOMED RESEARCH [2]	2850.	1.16	43.34	3.20	31077.	23.3	58.46	24.13
BIOLOGY [3]	17.	0.19	0.25	0.53	19.	3.8	49.41	20.00
CHEMISTRY [4]	44.	0.58	0.67	1.59	312.	12.1	57.50	26.62
PHYSICS [5]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
EARTH & SPACE SC [6]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
ENGRNG & TECHNOL [7]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
PSYCHOLOGY [8]	5.	0.05	0.08	0.15	5.	1.1	45.37	7.41
MATHEMATICS [9]	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00

NOTE: CHEMISTRY AND PSYCHOLOGY DATA SHOULD BE TREATED CAUTIOUSLY OVER TIME DUE TO INCONSISTENT DATABASE COVERAGE.

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*BID-SCI journal set citing BID-MEDLINE papers, 1973-80, but does not include citations received by 1979-80 publications. Activity index normalized against Fields 1 and 2. Citation counts scaled within subfield to 1973 equivalents.

Table 9B (Continued)

BIBLIOMETRIC PROFILE OF NIH
INTRAMURAL RESEARCH, 1977-80*

FIELD/SUBFIELD	NUMBER PAPERS	ACTIV INDEX	% INT EFFRT	% EXT EFFRT	TOTAL CITES	CITES PER PAPER	CITE T-SCR	% PAPERS AMONG TOP 10%
CLIN MEDICINE [1]								
GENRL & INTERNAL MED	501.	0.92	7.70	2.61	6199.	23.5	63.80	31.21
ALLERGY	16.	1.16	0.24	3.30	87.	13.5	65.45	30.77
ANESTHESIOLOGY	7.	0.18	0.11	0.52	22.	6.2	56.60	42.86
CANCER	764.	2.80	11.74	7.96	6504.	16.2	56.00	17.60
CARDIOVASCULAR SYSTM	113.	0.67	1.73	1.91	1019.	23.0	67.58	29.70
DENTISTRY	39.	0.37	0.59	1.06	67.	3.0	50.52	17.42
DERMAT & VENERL DIS	32.	0.70	0.49	2.00	252.	14.4	77.71	47.62
ENDOCRINOLOGY	221.	1.16	3.40	3.31	1747.	20.8	70.99	27.63
FERTILITY	9.	0.16	0.13	0.46	2.	1.8	44.10	0.00
GASTROENTEROLOGY	31.	0.54	0.47	1.53	207.	12.6	74.52	24.24
GERIATRICS	8.	0.26	0.13	0.73	8.	1.5	48.94	12.90
HEMATOLOGY	54.	0.73	0.83	2.08	251.	8.8	62.93	15.79
IMMUNOLOGY	654.	2.19	10.05	6.21	6868.	21.9	67.04	25.35
OBSTETRICS & GYNECOL	36.	0.37	0.55	1.06	159.	8.1	54.85	15.25
NEUROL & NEUROSURG	283.	0.69	4.35	1.96	1944.	13.5	55.15	19.42
OPHTHALMOLOGY	95.	1.10	1.46	3.11	414.	8.9	58.56	26.07
ORTHOPEDICS	2.	0.05	0.03	0.13	0.	0.0	0.00	0.00
ARTHRITIS & RHEUMAT	23.	0.77	0.35	2.19	223.	38.2	93.97	51.43
OTORHINOLARYNGOLOGY	13.	0.24	0.20	0.67	0.	0.0	42.56	0.00
PATHOLOGY	65.	0.76	1.00	2.17	258.	8.1	56.35	19.37
PEDIATRICS	53.	0.35	0.81	1.00	202.	7.7	55.21	29.75
PHARMACOLOGY	276.	1.04	4.23	2.96	1520.	15.0	56.47	22.61
PHARMACY	53.	0.60	0.81	1.70	240.	8.5	58.75	24.85
PSYCHIATRY	21.	0.22	0.33	0.61	104.	8.3	58.67	28.00
RADIOLOGY & NUCL MED	55.	0.34	0.85	0.97	204.	10.5	58.93	30.77
RESPIRATORY SYSTEM	17.	0.47	0.27	1.33	78.	11.4	81.59	19.51
SURGERY	65.	0.25	0.99	0.70	292.	7.8	55.17	20.80
TROPICAL MEDICINE	43.	2.16	0.66	6.14	191.	7.2	60.87	28.48
UROLOGY	17.	0.25	0.26	0.71	115.	12.5	75.82	36.36
NEPHROLOGY	8.	0.62	0.12	1.77	0.	0.0	0.00	0.00
VETERINARY MEDICINE	29.	0.36	0.45	1.03	53.	3.3	52.05	12.24
ADDICTIVE DISEASES	0.	0.00	0.00	0.00	0.	0.0	0.00	0.00
HYGIENE & PUBL HLTH	57.	1.27	0.87	3.60	125.	5.0	57.00	26.17
BIOMED RESEARCH [2]								
PHYSIOLOGY	79.	0.43	1.21	1.23	961.	23.8	62.21	26.03
ANATOMY & MORPHOLOGY	11.	0.46	0.16	1.30	6.	1.3	36.40	0.00
EMBRYOLOGY	40.	1.07	0.62	3.04	160.	7.4	37.90	6.15
GENETICS & HEREDITY	75.	0.95	1.15	2.71	249.	9.1	50.94	9.15
NUTRITION & DIETET	19.	0.29	0.29	0.83	70.	5.9	48.40	0.00
BIOCHEM & MOLEC BIOL	1233.	1.07	18.94	3.04	12680.	22.4	57.02	20.48
BIOPHYSICS	27.	1.08	0.42	3.06	89.	7.8	52.06	22.06
CELL BIOL CYT & HIST	160.	0.94	2.45	2.67	1416.	19.2	58.48	19.23
MICROBIOLOGY	62.	0.50	0.95	1.43	334.	11.4	58.72	21.59
VIROLOGY	321.	2.68	4.92	7.61	3409.	21.6	68.54	16.91
PARASITOLOGY	34.	0.88	0.53	2.49	69.	4.4	54.49	19.35
BIOMEDICAL ENGINRNG	11.	0.61	0.16	1.74	41.	5.8	69.72	42.86
MISC BIOMEDICAL RES	25.	1.41	0.38	3.99	14.	1.1	46.64	11.69
GENRL BIOMEDICAL RES	755.	1.57	11.60	4.45	10465.	29.6	59.44	22.74

SUMMARY

Bibliometrics, the development and analysis of data on publication, provides a reliable method for assessing support activity in biomedical research programs. This report applies bibliometric techniques to NIH-supported publications from 1973 to 1980 in 240 selected journals--the "BID-MEDLINE data set." Part I covers NIH as a whole, Part II the intramural research program.

As one application of bibliometrics, Part I compares funding and publication, both for papers supported by NIH totally and by the component In-Institutes. For NIH as a whole the correlation is very high, r = .90, when funds for 1965-77 are compared with publications three years later. For most of the individual Institutes, the values ranged between .70 and .95.

Between 1970 and 1980 total NIH-supported papers increased 30 percent and total BID-MEDLINE papers increased 40 percent. The most notable change in the distribution of papers was an increase in foreign papers that received no NIH support from 29.6 percent of the journal set to 32.9 percent.

When publications are classified by research level for two periods, 1973-76 and 1977-80, NIH is seen to have supported modest increases in basic research (14.5 percent) and clinical investigation (8.7 percent). More clinically oriented papers declined slightly (4.1 percent).

NIH supported a substantial number of papers in nearly every subfield. In Cancer and Immunology, NIH supported more than 40 percent of the total 1973-80 BID-MEDLINE papers. It supported more than 30 percent of all papers in seven other subfields.

NIH's "activity index"--a measure of NIH-supported publications in a subfield in relation to all publication in that subfield--was highest for Cancer: 1.59 in 1977-80, or 1.59 times the "expected" level. The other subfields in which the index for 1977-80 was higher than 1 (and publication exceeded 2,000 papers) were Endocrinology, Immunology, Physiology, Biochemistry, Molecular Biology, Cell Biology-Cytology-Histology, and General Biomedical Research.

Between 1973-76 and 1977-80, NIH support, as compared with other U.S., decreased notably in the clinical subfields Anesthesiology, Dermatology-Venereal Diseases, Otorhinolaryngology, and Surgery. All U.S. publication decreased in Geriatrics and Fertility. In contrast, NIH publications increased substantially relative to the rest of the U.S. in the subfields of Physiology, Immunology, Hematology, Biophysics, Respiratory System, Virology, Pharmacology, and Biochemistry-Molecular Biology. In several clinical subfields, NIH increases lagged well behind the rest of the U.S.--Allergy, Orthopedics, Arthritis, Pediatrics, Nephrology, and Nutrition-Dietetics.

NIH's record of supporting outstanding investigators is manifest in citations of NIH publications. In each of the 21 subfields in which NIH was most active over the entire period, more than 10 percent of the NIH-supported papers were in the top decile of cited papers. Indeed, over 10 percent of the papers in each of the subfields in which NIH supported any papers were in the top decile.

That the Institutes and other support sources are interdependent in their research is clear from interaction in citation. While 52 percent of the references in NIH-supported papers were to research supported by NIH, 48 percent were to research supported by others. Conversely, 54 percent of the citations of NIH research were in papers with other than NIH support. NIH receives 23 percent of its citations from foreign papers.

Publication profiles for NIH summarize its bibliometric activity for 1973-76 and 1977-80.

The crosscutting scientific interests of NIH programs are demonstrated. Clinical and basic disciplines that were substantially supported by more than one Institute are listed. In each of 14 disciplines, only one Institute was substantially involved. Predictably, all Institutes supported a substantial activity in Biochemistry and Molecular Biology.

Finally, Appendix A lists the 10 most highly cited NIH-supported papers and NIH intramural papers published each year from 1973 to 1977. Similarly, Appendix B lists papers published during those years by all U.S. and U.S.-supported authors, U.S. authors with non-Federal support, U.S. authors who did not acknowledge support, and foreign authors.

An analysis comparable to that represented above is given for the NIH Intramural Research Program (IRP), which accounts for about 10 percent of NIH-supported publications. Again, there is a strong correlation between obligations and number of papers published three years later (r = .93).

Between 1973-76 and 1977-80, the percent, but not number, of IRP papers at the most clinical levels decreased, whereas papers at the more basic levels--clinical investigation and basic research--increased in both number and percent.

The IRP and NIH altogether play a major support role in most clinical and basic research subfields, with 10 to 50 percent of the papers in all but two subfields acknowledging NIH support. The areas of greatest relative emphasis, for both NIH and the IRP, are Cancer, Virology, and Immunology. The activity indexes for these fields were 2.80, 2.68, and 2.19.

Citation of NIH-supported papers is analyzed for the period 1973-80. Among IRP papers, 26 percent were in the top citation decile. Sixteen percent of grantee papers were in that decile. This outstanding publication record virtually extends across the board of subfields. In the top citation deciles of their subfields were nearly 22 percent of the IRP papers and 15 percent of the grantee papers.

Complete publication profiles of the IRP are presented.

APPENDIX A

THE TEN MOST HIGHLY CITED PAPERS SUPPORTED BY NIH AND BY THE NIH INTRAMURAL PROGRAM

Appendix A provides information about highly cited individual papers. The 10 most highly cited papers supported by NIH in each year, 1973 through 1977, are listed in these tables. These are papers in the BID-MEDLINE data base, cited by 1973-80 papers. Since the 1978, 1979, and 1980 papers have less than three full years of citations attributed to them (by 1980), they are not included in these tables.

Lists of the 25 most highly cited papers supported by each Institute, and of the 25 most highly cited in each subfield and at each research level, for the years 1973 through 1977, are available in the Program Evaluation Branch, OD, NIH (phone: 301/496-4418). Information provided in these lists includes citation frequency rank, the number of citations received each year from 1973 through 1980, journal identification, authors, title, L/F/S (level, field, subfield), institutional affiliations of authors, and acknowledged support sources.

See also Appendix B for lists of the 10 most highly cited papers published each year from 1973 through 1977 in four categories: (1) U.S. authored and supported papers, (2) U.S. papers with non-Federal support, (3) U.S. papers with support unacknowledged, and (4) foreign papers.

APPENDIX A

Table 1

The Ten 1973 NIH-Supported Papers Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
1	598	0	64	81	95	102	95	94	67	DETECTION OF TWO RESTRICTION ENDONUCLEASE ACTIVITIES IN HAEMOPHILUS PARAINFLUENZAE USING ANALYTICAL AGAROSE--ETHIDIUM BROMIDE ELECTROPHORESIS. By: SHARP PA ; SUGDEN B ; SAMBROOK J In: BIOCHEMISTRY 12(16):3055-63, 31 JUL 73 Support source(s): CANCER INSTITUTE Corporate Address: COLD SP HRBR LAB
2	460	3	24	70	74	78	77	61	73	MICROTUBULE ASSEMBLY IN THE ABSENCE OF ADDED NUCLEOTIDES. By: SHELANSKI ML ; GASKIN F ; CANTOR CR In: PROC NATL ACAD SCI USA 70(3):765-8, MAR 73 Support source(s): HEART,LUNG, & BLOOD INSTITUTE NEUROL DISEASES & STROKE GENERAL MEDICAL SCIENCES Corporate Address: COLUMBIA, NYC NIH
3	396	5	43	42	66	73	62	48	57	CELLULAR LOCALIZATION OF AN EPSTEIN-BARR VIRUS (EBV)-ASSOCIATED COMPLEMENT-FIXING ANTIGEN IN PRODUCER AND NON-PRODUCER LYMPHOBLASTOID CELL LINES. By: REEDMAN BM ; KLEIN G In: INT J CANCER 11(3):499-520, MAY 73 Support source(s): CANCER INSTITUTE Corporate Address: FOREIGN
4	339	2	49	53	58	53	51	42	31	THE BIOCHEMISTRY OF PLANT LECTINS (PHYTOHEMAGGLUTININS). By: LIS H ; SHARON N In: ANNU REV BIOCHEM 42(0):541-74, 1973 Support source(s): LIBRARY OF MEDICINE NATL INSTITUTE OF HEALTH-GENL DEPT OF AGRICULTURE Corporate Address: FOREIGN
5	321	0	15	27	38	52	64	63	62	MATURATION OF THE HEAD OF BACTERIOPHAGE T4. I. DNA PACKAGING EVENTS. By: LAEMMLI UK ; FAVRE M In: J MOL BIOL 80(4):575-99, 15 NOV 73 Support source(s): GENERAL MEDICAL SCIENCES Corporate Address: PRINCETON U

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX A

Table 1 (Continued)

The Ten 1973 NIH-Supported Papers
Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	263	3	20	23	33	43	49	47	45	A HOMOLOGOUS RADIOIMMUNOASSAY FOR HUMAN PROLACTIN. By: SINHA YN ; SELBY FW ; LEWIS UJ ; VANDERLAAN WP In: J CLIN ENDOCRINOL METAB 36(3):509-16, MAR 73 Support source(s): ARTHR & METABOL DIS AMERICAN CANCER SOCIETY Corporate Address: SCRIPPS CLINIC
7	246	5	23	23	35	43	40	31	46	AN ENZYMATIC FUNCTION ASSOCIATED WITH TRANSFORMATION OF FIBROBLASTS BY ONCOGENIC VIRUSES. I. CHICK EMBRYO FIBROBLAST CULTURES TRANSFORMED BY AVIAN RNA TUMOR VIRUSES. By: UNKELESS JC ; TOBIA A ; OSSOWSKI L ; QUIGLEY JP ; RIFKIN DB REICH E In: J EXP MED 137(1):85-111, 1 JAN 73 Support source(s): AMERICAN CANCER SOCIETY CANCER INSTITUTE Corporate Address: ROCKFLR U, NY
8	245	3	30	33	41	29	45	27	37	EVIDENCE FOR RECYCLING OF SYNAPTIC VESICLE MEMBRANE DURING TRANSMITTER RELEASE AT THE FROG NEUROMUSCULAR JUNCTION. By: HEUSER JE ; REESE TS In: J CELL BIOL 57(2):315-44, MAY 73 Support source(s): NEUROL DISEASES & STROKE Corporate Address: NIH
9	241	1	13	37	37	34	32	44	43	FUNCTION OF MACROPHAGES IN ANTIGEN RECOGNITION BY GUINEA PIG T LYMPHOCYTES. I. REQUIREMENT FOR HISTOCOMPATIBLE MACROPHAGES AND LYMPHOCYTES. By: ROSENTHAL AS ; SHEVACH EM In: J EXP MED 138(5):1194-212, 1 NOV 73 Support source(s): ALLERG & INFECT DISEASES Corporate Address: NIH
10	231	1	16	34	23	33	37	43	44	BIOLOGICAL DEFENSE MECHANISMS. THE PRODUCTION BY LEUKOCYTES OF SUPEROXIDE, A POTENTIAL BACTERICIDAL AGENT. By: BABIOR BM ; KIPNES RS ; CURNUTTE JT In: J CLIN INVEST 52(3):741-4, MAR 73 Support source(s): ARTHR & METABOL DIS DIV RESCH FACIL & RESOURCES Corporate Address: HARVARD MED

APPENDIX A

Table 1 (Continued)

The Ten 1973 NIH-Supported Papers
Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
10	231	0	17	35	44	33	38	40	24	MICROFLUOROMETRIC DETECTION OF DEOXYRIBONUCLEIC ACID REPLICATION IN HUMAN METAPHASE CHROMOSOMES. By: LATT SA In: PROC NATL ACAD SCI USA 70(12):3395-9, DEC 73 Support source(s): CHILD HEALTH & HUMAN DEV Corporate Address: CHL HOS MED CTR HARVARD MED

APPENDIX A

Table 2

The Ten 1974 NIH-Supported Papers
Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	649		8	30	81	96	125	133	176	A HIGHLY SENSITIVE ADENYLATE CYCLASE ASSAY. By: SALOMON Y ; LONDOS C ; RODBELL M In: ANAL BIOCHEM 58(2):541-8, APR 74 Support source(s): ARTHR & METABOL DIS DENTAL RESEARCH Corporate Address: NIH
2	375		0	11	48	64	79	91	82	A SIMPLIFIED METHOD FOR CYANOGEN BROMIDE ACTIVATION OF AGAROSE FOR AFFINITY CHROMATOGRAPHY. By: MARCH SC ; PARIKH I ; CUATRECASAS P In: ANAL BIOCHEM 60(1):149-52, JUL 74 Support source(s): ARTHR & METABOL DIS GENERAL MEDICAL SCIENCES Corporate Address: JOHNS HOPKINS MED
3	346		5	51	71	98	54	47	20	SPHEROID CHROMATIN UNITS (V BODIES). By: OLINS AL ; OLINS DE In: SCIENCE 183(122):330-2, 25 JAN 74 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) GENERAL MEDICAL SCIENCES Corporate Address: U TENN, KNOXVLL OAK RIDGE LABS
4	344		11	44	63	67	72	48	39	PREDICTION OF PROTEIN CONFORMATION. By: CHOU PY ; FASMAN GD In: BIOCHEMISTRY 13(2):222-45, 15 JAN 74 Support source(s): GENERAL MEDICAL SCIENCES NATL SCIENCE FOUNDATION AMERICAN HEART ASSOC Corporate Address: BRANDEIS U, WALT
5	318		3	42	58	61	53	62	39	ARENE OXIDES: A NEW ASPECT OF DRUG METABOLISM. By: JERINA DM ; DALY JW In: SCIENCE 185(151):573-82, 16 AUG 74 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX A

Table 2 (Continued)

The Ten 1974 NIH-Supported Papers
Most Highly Cited in 1974-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
6	314		3	28	39	49	67	68	60	INSULIN-DEPENDENT REGULATION OF INSULIN RECEPTOR CONCENTRATIONS: A DIRECT DEMONSTRATION IN CELL CULTURE. By: GAVIN JR 3D ; ROTH J ; NEVILLE DM JR ; MEYTS P DE ; BUELL DN In: PROC NATL ACAD SCI USA 71(1):84-8, JAN 74 Support source(s): ARTHR & METABOL DIS CANCER INSTITUTE FOGARTY INTERNATL CENTER Corporate Address: NIH NIMH
7	237		1	35	58	36	41	38	28	MEMBRANE RECEPTORS. By: CUATRECASAS P In: ANNU REV BIOCHEM 43(0):169-214, 1974 Support source(s): ARTHR & METABOL DIS NATL SCIENCE FOUNDATION AMERICAN CANCER SOCIETY Corporate Address: JOHNS HOPKINS MED
8	230		4	28	39	42	34	40	43	ACTIN ANTIBODY: THE SPECIFIC VISUALIZATION OF ACTIN FILAMENTS IN NON-MUSCLE CELLS. By: LAZARIDES E ; WEBER K In: PROC NATL ACAD SCI USA 71(6):2268-72, JUN 74 Support source(s): CANCER INSTITUTE Corporate Address: COLD SP HRBR LAB
9	227		0	6	31	39	43	53	55	MAGNESIUM PRECIPITATION OF RIBONUCLEOPROTEIN COMPLEXES. EXPEDIENT TECHNIQUES FOR THE ISOLATION OF UNDERGRADED POLYSOMES AND MESSENGER RIBONUCLEIC ACID. By: PALMITER RD In: BIOCHEMISTRY 13(17):3606-15, 13 AUG 74 Support source(s): CHILD HEALTH & HUMAN DEV NATL SCIENCE FOUNDATION PRIVATE FOR PROFIT Corporate Address: HARVARD U, CMBRG
9	227		14	31	43	44	29	31	35	CONFORMATIONAL PARAMETERS FOR AMINO ACIDS IN HELICAL, BETA-SHEET, AND RANDOM COIL REGIONS CALCULATED FROM PROTEINS. By: CHOU PY ; FASMAN GD In: BIOCHEMISTRY 13(2):211-22, 15 JAN 74 Support source(s): GENERAL MEDICAL SCIENCES NATL SCIENCE FOUNDATION AMERICAN HEART ASSOC Corporate Address: BRANDEIS U, WALT

APPENDIX A

Table 3

The Ten 1975 NIH-Supported Papers
Most Highly Cited in 1975-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
1	554			0	9	34	93	201	217	RAPID ISOLATION OF ANTIGENS FROM CELLS WITH A STAPHYLOCOCCAL PROTEIN A-ANTIBODY ADSORBENT: PARAMETERS OF THE INTERACTION OF ANTIBODY-ANTIGEN COMPLEXES WITH PROTEIN A. By: KESSLER SW In: J IMMUNOL 115(6):1617-24, DEC 75 Support source(s): CANCER INSTITUTE Corporate Address: UCLA MED SCH
2	475			2	14	76	103	151	129	TRANSFER OF PROTEINS ACROSS MEMBRANES. I. PRESENCE OF PROTEOLYTICALLY PROCESSED AND UNPROCESSED NASCENT IMMUNOGLOBULIN LIGHT CHAINS ON MEMBRANE-BOUND RIBOSOMES OF MURINE MYELOMA. By: BLOBEL G ; DOBBERSTEIN B In: J CELL BIOL 67(3):835-51, DEC 75 Support source(s): CANCER INSTITUTE Corporate Address: ROCKFLR U, NY
3	333			5	60	72	62	66	68	FUNCTIONAL SUBCLASSES OF T-LYMPHOCYTES BEARING DIFFERENT LY ANTIGENS. I. THE GENERATION OF FUNCTIONALLY DISTINCT T-CELL SUBCLASSES IS A DIFFERENTIATIVE PROCESS INDEPENDENT OF ANTIGEN. By: CANTOR H ; BOYSE EA In: J EXP MED 141(6):1376-89, 1 JUN 75 Support source(s): CANCER INSTITUTE ALLERG & INFECT DISEASES Corporate Address: CHILDRENS CANC RES FDN SLOAN-KTRG CANC RES INST, NY
4	295			2	23	39	55	77	99	NUCLEOTIDE SEQUENCE OF THE RIGHTWARD OPERATOR OF PHAGE LAMBDA. By: MANIATIS T ; JEFFREY A ; KLEID DG In: PROC NATL ACAD SCI USA 72(3):1184-8, MAR 75 Support source(s): NATL SCIENCE FOUNDATION NATL INSTITUTE OF HEALTH-GENL Corporate Address: HARVARD U, CMBRG
5	285			3	15	59	67	74	67	CHAIN LENGTH DETERMINATION OF SMALL DOUBLE- AND SINGLE-STRANDED DNA MOLECULES BY POLYACRYLAMIDE GEL ELECTROPHORESIS. By: MANIATIS T ; JEFFREY A ; VAN DESANDE H In: BIOCHEMISTRY 14(17):3787-94, 26 AUG 75 Support source(s): NATL INSTITUTE OF HEALTH-GENL NATL SCIENCE FOUNDATION Corporate Address: HARVARD U, CMBRG MIT, CAMBRIDGE

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX A

Table 3 (Continued)

The Ten 1975 NIH-Supported Papers Most Highly Cited in 1975-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
6	282			6	55	51	49	60	61	FUNCTIONAL SUBCLASSES OF T LYMPHOCYTES BEARING DIFFERENT LY ANTIGENS. II. COOPERATION BETWEEN SUBCLASSES OF LY+ CELLS IN THE GENERATION OF KILLER ACTIVITY. By: CANTOR H ; BOYSE EA In: J EXP MED 141(6):1390-9, 1 JUN 75 Support source(s): CANCER INSTITUTE ALLERG & INFECT DISEASES Corporate Address: CHILDRENS CANC RES FDN SLOAN-KTRG CANC RES INST, NY
7	246			12	31	49	55	56	43	STUDIES ON THE CLEAVAGE OF BACTERIOPHAGE LAMBDA DNA WITH ECORI RESTRICTION ENDONUCLEASE. By: THOMAS M ; DAVIS RW In: J MOL BIOL 91(3):315-28, 25 JAN 75 Support source(s): GENERAL MEDICAL SCIENCES PRIVATE FOR PROFIT Corporate Address: STANFORD U MED
8	215			6	25	39	36	60	49	IDENTIFICATION OF A CALCIUM-BINDING PROTEIN AS A CALCIUM-DEPENDENT REGULATOR OF BRAIN ADENYLATE CYCLASE. By: BROSTROM CO ; HUANG YC ; BRECKENRIDGE BM ; WOLFF DJ In: PROC NATL ACAD SCI USA 72(1):64-8, JAN 75 Support source(s): NEUROL DISEASES & STROKE Corporate Address: RUTGERS U, N BRUN
9	214			1	27	46	39	52	49	THE SODIUM-POTASSIUM ADENOSINE TRIPHOSPHATASE: PHARMACOLOGICAL, PHYSIOLOGICAL AND BIOCHEMICAL ASPECTS. By: SCHWARTZ A ; LINDENMAYER GE ; ALLEN JC In: PHARMACOL REV 27(01):3-134, MAR 75 Support source(s): HEART,LUNG, & BLOOD INSTITUTE NATL INSTITUTE OF HEALTH-GENL AMERICAN HEART ASSOC Corporate Address: BAYLOR U, HOUSTON (MED) UNIDENTIFIED
10	203			3	51	37	36	49	27	BONE-MARROW TRANSPLANTATION (FIRST OF TWO PARTS). By: THOMAS E ; STORB R ; CLIFT RA ; FEFER A ; JOHNSON FL ; NEIMAN PE LERNER KG ; GLUCKSBERG H ; BUCKNER CD In: N ENGL J MED 292(16):832-43, 17 APR 75 Support source(s): CANCER INSTITUTE ALLERG & INFECT DISEASES AMERICAN CANCER SOCIETY Corporate Address: U WASH MED UNIDENTIFIED

APPENDIX A

Table 4

The Ten 1976 NIH-Supported Papers Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	1077				0	30	140	360	547	A RAPID AND SENSITIVE METHOD FOR THE QUANTITATION OF MICROGRAM QUANTITIES OF PROTEIN UTILIZING THE PRINCIPLE OF PROTEIN-DYE BINDING. By: BRADFORD MM In: ANAL BIOCHEM 72:248-54, 7 MAY 76 Support source(s): CHILD HEALTH & HUMAN DEV FORD FOUNDATION Corporate Address: U GA, ATHENS
2	280				22	62	74	65	57	SURFACE MODULATION IN CELL RECOGNITION AND CELL GROWTH. By: EDELMAN GM In: SCIENCE 192(4236):218-26, 16 APR 76 Support source(s): ALLERG & INFECT DISEASES ARTHR & METABOL DIS CHILD HEALTH & HUMAN DEV Corporate Address: ROCKFLR U, NY
3	253				3	41	70	71	68	CELL SURFACE PROTEINS AND MALIGNANT TRANSFORMATION. By: HYNES RO In: BIOCHIM BIOPHYS ACTA 458(1):73-107, 30 APR 76 Support source(s): CANCER INSTITUTE Corporate Address: MIT, CAMBRIDGE
4	250				16	49	72	60	53	TRANSMEMBRANE CONTROL OF THE RECEPTORS ON NORMAL AND TUMOR CELLS. I. CYTOPLASMIC INFLUENCE OVER SURFACE COMPONENTS. By: NICOLSON GL In: BIOCHIM BIOPHYS ACTA 457(1):57-108, 13 APR 76 Support source(s): CANCER BIOL & DIAG - CANC INST NATL SCIENCE FOUNDATION CANCER INSTITUTE Corporate Address: U CAL, IRVINE SALK INST BIOL
5	236				4	43	58	74	57	THE ROLE OF POLYPRENOL-LINKED SUGARS IN GLYCOPROTEIN SYNTHESIS. By: WAECHTER CJ ; LENNARZ WJ In: ANNU REV BIOCHEM 45:95-112, 1976 Support source(s): NEUROL DISEASES & STROKE UNIV+MED SCHOOLS(STATE) ALLERG & INFECT DISEASES Corporate Address: JOHNS HOPKINS MED U MD, BALTIMORE (MED)

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX A

Table 4 (Continued)

The Ten 1976 NIH-Supported Papers
Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	227				21	67	49	52	38	IDENTIFICATION OF MUTAGENIC METABOLITES OF BENZO(A)PYRENE IN MAMMALIAN CELLS. By: HUBERMAN E ; SACHS L ; YANG SK ; GELBOIN V In: PROC NATL ACAD SCI USA 73(2):607-11, FEB 76 Support source(s): CANCER INSTITUTE Corporate Address: NIH FOREIGN
7	216				0	29	68	59	60	1,4-DIAMINOBUTANE (PUTRESCINE), SPERMIDINE, AND SPERMINE. By: TABOR CW ; TABOR H In: ANNU REV BIOCHEM 45:285-306, 1976 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
8	214				0	30	56	62	66	INTRACELLULAR PROTEIN DEGRADATION IN MAMMALIAN AND BACTERIAL CELLS: PART 2. By: GOLDBERG AL ; ST. JOHN AC In: ANNU REV BIOCHEM 45:747-803, 1976 Support source(s): NEUROL DISEASES & STROKE MUSCULAR DYSTROPHY ASSOC Corporate Address: HARVARD MED
9	193				5	25	29	67	67	ASSAY OF PROTEINS IN THE PRESENCE OF INTERFERING MATERIALS. By: BENSADOUN A ; WEINSTEIN D In: ANAL BIOCHEM 70(1):241-50, JAN 76 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: U CAL MED, S DIEGO CORNELL U, ITHACA
10	181				20	52	45	40	24	RECEPTOR-MEDIATED CONTROL OF CHOLESTEROL METABOLISM. By: BROWN MS ; GOLDSTEIN JL In: SCIENCE 191(4223):150-4, 16 JAN 76 Support source(s): HEART,LUNG, & BLOOD INSTITUTE GENERAL MEDICAL SCIENCES AMERICAN HEART ASSOC Corporate Address: U TEX, COMB MED

APPENDIX A

Table 5

The Ten 1977 NIH-Supported Papers Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	742					64	175	234	269	A NEW METHOD FOR SEQUENCING DNA. By: MAXAM AM ; GILBERT W In: PROC NATL ACAD SCI USA 74(2):560-4, FEB 77 Support source(s): GENERAL MEDICAL SCIENCES AMERICAN CANCER SOCIETY Corporate Address: HARVARD U, CMBRG
2	432					10	69	169	184	PEPTIDE MAPPING BY LIMITED PROTEOLYSIS IN SODIUM DODECYL SULFATE AND ANALYSIS BY GEL ELECTROPHORESIS. By: CLEVELAND DW ; FISCHER SG ; KIRSCHNER MW ; LAEMMLI UK In: J BIOL CHEM 252(3):1102-6, 10 FEB 77 Support source(s): CANCER INSTITUTE GENERAL MEDICAL SCIENCES NATL SCIENCE FOUNDATION Corporate Address: PRINCETON U
3	296					9	39	104	144	LABELING DEOXYRIBONUCLEIC ACID TO HIGH SPECIFIC ACTIVITY IN VITRO BY NICK TRANSLATION WITH DNA POLYMERASE I. By: RIGBY PW ; DIECKMANN M ; RHODES C ; BERG P In: J MOL BIOL 113(1):237-51, 15 JUN 77 Support source(s): GENERAL MEDICAL SCIENCES AMERICAN CANCER SOCIETY Corporate Address: STANFORD U MED
4	242					16	59	87	80	ANALYSIS OF RESTRICTION FRAGMENTS OF T7 DNA AND DETERMINATION OF MOLECULAR WEIGHTS BY ELECTROPHORESIS IN NEUTRAL AND ALKALINE GELS. By: MCDONELL MW ; SIMON MN ; STUDIER FW In: J MOL BIOL 110(1):119-46, 15 FEB 77 Support source(s): GENERAL MEDICAL SCIENCES Corporate Address: BROOKHVN LABS
5	240					3	47	92	98	FUNCTIONAL ANALYSIS OF TWO HUMAN T-CELL SUBPOPULATIONS: HELP AND SUPPRESSION OF B-CELL RESPONSES BY T CELLS BEARING RECEPTORS FOR IGM OR IGG. By: MORETTA L ; WEBB SR ; GROSSI CE ; LYDYARD PM ; COOPER MD In: J EXP MED 146(1):184-200, 1 JUL 77 Support source(s): CANCER INSTITUTE RESEARCH RESOURCES - NIH Corporate Address: U ALABAMA, BRMGHA U ALAB MED, BRMGH

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX A

Table 5 (Continued)

The Ten 1977 NIH-Supported Papers
Most Highly Cited in 1977-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
5	240					9	62	83	86	COMMON PRECURSOR TO CORTICOTROPINS AND ENDORPHINS. By: MAINS RE ; EIPPER BA ; LING N In: PROC NATL ACAD SCI USA 74(7):3014-8, JUL 77 Support source(s): ARTHR & METABOL DIS RESEARCH RESOURCES - NIH CHILD HEALTH & HUMAN DEV Corporate Address: SALK INST BIOL U COLO MED CTR
7	184					11	62	62	49	MEMBRANE ASYMMETRY. By: ROTHMAN JE ; LENARD J In: SCIENCE 195(4280):743-53, 25 FEB 77 Support source(s): ALLERG & INFECT DISEASES NATL SCIENCE FOUNDATION Corporate Address: MIT, CAMBRIDGE RUTGERS U, N BRUN
8	175					9	47	63	56	A NEW CLASS OF MURINE LEUKEMIA VIRUS ASSOCIATED WITH DEVELOPMENT OF SPONTANEOUS LYMPHOMAS. By: HARTLEY JW ; WOLFORD NK ; OLD LJ ; ROWE WP In: PROC NATL ACAD SCI USA 74(2):789-92, FEB 77 Support source(s): CANCER INSTITUTE Corporate Address: SLOAN-KTRG CANC RES INST, NY NIH
9	168					13	69	59	27	SPLICED SEGMENTS AT THE 5' TERMINUS OF ADENOVIRUS 2 LATE MRNA. By: BERGET SM ; MOORE C ; SHARP PA In: PROC NATL ACAD SCI USA 74(8):3171-5, AUG 77 Support source(s): AMERICAN CANCER SOCIETY CANCER INSTITUTE Corporate Address: MIT, CAMBRIDGE
10	167					1	36	61	69	HIGH DENSITY LIPOPROTEIN AS A PROTECTIVE FACTOR AGAINST CORONARY HEART DISEASE. THE FRAMINGHAM STUDY. By: GORDON T ; CASTELLI WP ; HJORTLAND MC ; KANNEL WB ; DAWBER TR In: AM J MED 62(5):707-14, MAY 77 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: NIH

APPENDIX A

Table 6

The Ten 1973 NIH Intramural Papers Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	460	3	24	70	74	78	77	61	73	MICROTUBULE ASSEMBLY IN THE ABSENCE OF ADDED NUCLEOTIDES. By: SHELANSKI ML ; GASKIN F ; CANTOR CR In: PROC NATL ACAD SCI USA 70(3):765-8, MAR 73 Support source(s): HEART,LUNG, & BLOOD INSTITUTE NEUROL DISEASES & STROKE GENERAL MEDICAL SCIENCES Corporate Address: COLUMBIA, NYC NIH
2	245	3	30	33	41	29	45	27	37	EVIDENCE FOR RECYCLING OF SYNAPTIC VESICLE MEMBRANE DURING TRANSMITTER RELEASE AT THE FROG NEUROMUSCULAR JUNCTION. By: HEUSER JE ; REESE TS In: J CELL BIOL 57(2):315-44, MAY 73 Support source(s): NEUROL DISEASES & STROKE Corporate Address: NIH
3	241	1	13	37	37	34	32	44	43	FUNCTION OF MACROPHAGES IN ANTIGEN RECOGNITION BY GUINEA PIG T LYMPHOCYTES. I. REQUIREMENT FOR HISTOCOMPATIBLE MACROPHAGES AND LYMPHOCYTES. By: ROSENTHAL AS ; SHEVACH EM In: J EXP MED 138(5):1194-212, 1 NOV 73 Support source(s): ALLERG & INFECT DISEASES Corporate Address: NIH
4	178	4	23	22	18	21	32	31	27	ASYMMETRIC SEPTAL HYPERTROPHY. ECHOCARDIOGRAPHIC IDENTIFICATION OF THE PATHOGNOMONIC ANATOMIC ABNORMALITY OF IHSS. By: HENRY WL ; CLARK CE ; EPSTEIN SE In: CIRCULATION 47(2):225-33, FEB 73 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: NIH
5	175	7	18	22	30	24	30	28	16	INSULIN-RECEPTOR INTERACTION IN THE OBESE-HYPERGLYCEMIC MOUSE. A MODEL OF INSULIN RESISTANCE. By: KAHN CR ; NEVILLE DM JR ; ROTH J In: J BIOL CHEM 248(1):244-50, 10 JAN 73 Support source(s): NATL INST MENTAL HEALTH ARTHR & METABOL DIS Corporate Address: NIH NIMH

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX A

Table 6 (Continued)

The Ten 1973 NIH Intramural Papers
Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	153	2	15	24	31	21	21	20	19	PEPTIDE HORMONE BINDING TO RECEPTORS: A REVIEW OF DIRECT STUDIES IN VITRO. By: ROTH J In: METABOLISM 22(8):1059-73, AUG 73 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
7	152	1	36	24	21	16	23	22	9	INDEPENDENT SEGREGATION OF LOCI FOR ACTIVATION OF BIOLOGICALLY DISTINGUISHABLE RNA C-TYPE VIRUSES IN MOUSE CELLS. By: AARONSON SA ; STEPHENSON JR In: PROC NATL ACAD SCI USA 70(7):2055-8, JUL 73 Support source(s): CANCER INSTITUTE Corporate Address: NIH
8	151	6	19	22	23	14	17	25	25	CHARACTERISTICS OF THE HUMAN LYMPHOCYTE INSULIN RECEPTOR. By: GAVIN JR 3D ; GORDEN P ; ROTH J ; ARCHER JA ; BUELL DN In: J BIOL CHEM 248(6):2202-7, 25 MAR 73 Support source(s): ARTHR & METABOL DIS CANCER INSTITUTE Corporate Address: NIH
9	145	0	11	10	23	33	22	23	23	FUNCTION OF MACROPHAGES IN ANTIGEN RECOGNITION BY GUINEA PIG T LYMPHOCYTES. II. ROLE OF THE MACROPHAGE IN THE REGULATION OF GENETIC CONTROL OF THE IMMUNE RESPONSE. By: SHEVACH EM ; ROSENTHAL AS In: J EXP MED 138(5):1213-29, 1 NOV 73 Support source(s): ALLERG & INFECT DISEASES Corporate Address: NIH
10	140	0	18	25	31	23	10	21	12	A MOUSE B-CELL ALLOANTIGEN DETERMINED BY GENE(S) LINKED TO THE MAJOR HISTOCOMPATIBILITY COMPLEX. By: SACHS DH ; CONE JL In: J EXP MED 138(6):1289-304, 1 DEC 73 Support source(s): CANCER INSTITUTE Corporate Address: NIH

Table 7

The Ten 1974 NIH Intramural Papers Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	649		8	30	81	96	125	133	176	A HIGHLY SENSITIVE ADENYLATE CYCLASE ASSAY. By: SALOMON Y ; LONDOS C ; RODBELL M In: ANAL BIOCHEM 58(2):541-8, APR 74 Support source(s): ARTHR & METABOL DIS DENTAL RESEARCH Corporate Address: NIH
2	318		3	42	58	61	53	62	39	ARENE OXIDES: A NEW ASPECT OF DRUG METABOLISM. By: JERINA DM ; DALY JW In: SCIENCE 185(151):573-82, 16 AUG 74 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
3	314		3	28	39	49	67	68	60	INSULIN-DEPENDENT REGULATION OF INSULIN RECEPTOR CONCENTRATIONS: A DIRECT DEMONSTRATION IN CELL CULTURE. By: GAVIN JR 3D ; ROTH J ; NEVILLE DM JR ; MEYTS P DE ; BUELL DN In: PROC NATL ACAD SCI USA 71(1):84-8, JAN 74 Support source(s): ARTHR & METABOL DIS CANCER INSTITUTE FOGARTY INTERNATL CENTER Corporate Address: NIH NIMH
4	214		0	13	34	38	50	41	38	ROLE OF SUPPRESSOR T CELLS IN PATHOGENESIS OF COMMON VARIABLE HYPOGAMMAGLOBULINAEMIA. By: WALDMANN TA ; DURM M ; BRODER S ; BLACKMAN M ; BLAESE RM ; STROBER W In: LANCET 2(7881):609-13, 14 SEP 74 Support source(s): CANCER INSTITUTE Corporate Address: NIH
5	180		12	33	34	33	20	25	23	MODULATION OF INFLAMMATION AND IMMUNITY BY CYCLIC AMP. By: BOURNE HR ; LICHTENSTEIN LM ; MELMON KL ; HENNEY CS ; WEINSTEIN Y SHEARER GM In: SCIENCE 184(132):19-28, 5 APR 74 Support source(s): HEART,LUNG, & BLOOD INSTITUTE GENERAL MEDICAL SCIENCES ALLERG & INFECT DISEASES Corporate Address: U CAL MED, S FRAN JOHNS HOPKINS MED NIH

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*BID-SCI journal set citing BID-MEDLINE papers.

Table 7 (Continued)

The Ten 1974 NIH Intramural Papers
Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	167		5	39	27	28	19	29	20	ADRIAMYCIN. A NEW ANTICANCER DRUG WITH SIGNIFICANT CLINICAL ACTIVITY. By: BLUM RH ; CARTER SK In: ANN INTERN MED 80(2):249-59, FEB 74 Support source(s): CANCER INSTITUTE Corporate Address: NIH
7	165		1	12	21	22	28	37	44	GLUTATHIONE S-TRANSFERASES. THE FIRST ENZYMATIC STEP IN MERCAPTURIC ACID FORMATION. By: HABIG WH ; PABST MJ ; JAKOBY WB In: J BIOL CHEM 249(22):7130-9, 25 NOV 74 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
8	164		0	22	35	25	32	25	25	EVIDENCE OF SUPPRESSOR CELL ACTIVITY IN SPLEENS OF MICE BEARING PRIMARY TUMORS INDUCED BY MOLONEY SARCOMA VIRUS. By: KIRCHNER H ; CHUSED TM ; HERBERMAN RB ; HOLDEN HT ; LAVRIN DH In: J EXP MED 139(6):1473-87, 1 JUN 74 Support source(s): CANCER INSTITUTE DENTAL RESEARCH Corporate Address: NIH UNIDENTIFIED
9	143		2	25	27	13	27	24	25	QUANTITATIVE ASPECTS OF THE INSULIN-RECEPTOR INTERACTION IN LIVER PLASMA MEMBRANES. By: KAHN CR ; FREYCHET P ; ROTH J ; NEVILLE DM JR In: J BIOL CHEM 249(7):2249-57, 10 APR 74 Support source(s): ARTHR & METABOL DIS NATL INST MENTAL HEALTH Corporate Address: NIH NIMH
10	141		1	22	26	42	28	10	12	STUDIES OF THE HUMAN LYMPHOCYTE RECEPTOR FOR HEAT-AGGREGATED OR ANTIGEN-COMPLEXED IMMUNOGLOBULIN. By: DICKLER HB In: J EXP MED 140(2):508-22, 1 AUG 74 Support source(s): CANCER INSTITUTE NATL INSTITUTE OF HEALTH-GENL Corporate Address: NIH

APPENDIX A

Table 8

The Ten 1975 NIH Intramural Papers Most Highly Cited in 1975-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
1	189			2	34	35	38	45	35	CLONAL CELLS LINES FROM A FERAL MOUSE EMBRYO WHICH LACK HOST-RANGE RESTRICTIONS FOR MURINE LEUKEMIA VIRUSES. By: HARTLEY JW ; ROWE WP In: VIROLOGY 65(1):128-34, MAY 75 Support source(s): ALLERG & INFECT DISEASES Corporate Address: NIH
2	174			1	26	42	33	41	31	NATURAL CYTOTOXIC REACTIVITY OF MOUSE LYMPHOID CELLS AGAINST SYNGENEIC ACID ALLOGENEIC TUMORS. I. DISTRIBUTION OF REACTIVITY AND SPECIFICITY. By: HERBERMAN RB ; NUNN ME ; LAVRIN DH In: INT J CANCER 16(2):216-29, 15 AUG 75 Support source(s): NATL INSTITUTE OF HEALTH-GENL Corporate Address: NIH UNIDENTIFIED
3	152			1	24	43	28	31	25	ROLE OF CYCLIC NUCLEOTIDES IN GROWTH CONTROL. By: PASTAN IH ; JOHNSON GS ; ANDERSON WB In: ANNU REV BIOCHEM 44:491-522, 1975 Support source(s): CANCER INSTITUTE Corporate Address: NIH
4	144			1	21	43	26	30	23	NATURAL CYTOTOXIC REACTIVITY OF MOUSE LYMPHOID CELLS AGAINST SYNGENEIC AND ALLOGENEIC TUMORS. II. CHARACTERIZATION OF EFFECTOR CELLS. By: HERBERMAN RB ; NUNN ME ; HOLDEN HT ; LAVRIN DH In: INT J CANCER 16(2):230-9, 15 AUG 75 Support source(s): CANCER INSTITUTE Corporate Address: NIH UNIDENTIFIED
5	143			5	25	49	26	22	16	A COMPARISON OF THE DIGESTION OF NUCLEI AND CHROMATIN BY STAPHYLOCOCCAL NUCLEASE. By: SOLLNER-WEBB B ; FELSENFELD G In: BIOCHEMISTRY 14(13):2915-20, JUL 75 Support source(s): ARTHR & METABOL DIS NATL INSTITUTE OF HEALTH-GENL Corporate Address: NIH
6	138			7	18	24	25	42	22	SIMIAN VIRUS 40 FUNCTIONS REQUIRED FOR THE ESTABLISHMENT AND MAINTENANCE OF MALIGNANT TRANSFORMATION. By: MARTIN RG ; CHOU JY In: J VIROL 15(3):599-612, MAR 75 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH

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*BID-SCI journal set citing BID-MEDLINE papers.

Table 8 (Continued)

The Ten 1975 NIH Intramural Papers Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
7	128			27	35	34	15	9	8	METHYLATED NUCLEOTIDES BLOCK 5'-TERMINUS OF VACCINIA VIRUS MESSENGER RNA. By: WEI CM ; MOSS B In: PROC NATL ACAD SCI USA 72(1):318-22, JAN 75 Support source(s): ALLERG & INFECT DISEASES Corporate Address: NIH
8	123			1	19	28	31	25	19	RAPID CHANGES IN RAT PINEAL BETA-ADRENERGIC RECEPTOR: ALTERATIONS IN L-(3H)ALPRENOLOL BINDING AND ADENYLATE CYCLASE. By: KEBABIAN JW ; ZATZ M ; ROMERO JA ; AXELROD J In: PROC NATL ACAD SCI USA 72(9):3735-9, SEP 75 Support source(s): GENERAL MEDICAL SCIENCES NATL INST MENTAL HEALTH Corporate Address: NIH NIMH
9	112			20	33	24	14	12	9	TYPE C RNA TUMOR VIRUS ISOLATED FROM CULTURED HUMAN ACUTE MYELOGENOUS LEUKEMIA CELLS. By: GALLAGHER RE ; GALLO RC In: SCIENCE 187(4174):350-3, 31 JAN 75 Support source(s): CANCER INSTITUTE Corporate Address: NIH
10	109			14	23	20	22	15	15	INHIBITION OF PROLIFERATION OF LYMPHOMA CELLS AND T LYMPHOCYTES BY SUPPRESSOR CELLS FROM SPLEENS OF TUMOR-BEARING MICE. By: KIRCHNER H ; MUCHMORE AV ; CHUSED TM ; HOLDEN HT ; HERBERMAN RB In: J IMMUNOL 114(1 PT 1):206-10, JAN 75 Support source(s): DENTAL RESEARCH Corporate Address: NIH

APPENDIX A

Table 9

The Ten 1976 NIH Intramural Papers Most Highly Cited in 1976-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
1	227				21	67	49	52	38	IDENTIFICATION OF MUTAGENIC METABOLITES OF BENZO(A)PYRENE IN MAMMALIAN CELLS. By: HUBERMAN E ; SACHS L ; YANG SK ; GELBOIN V In: PROC NATL ACAD SCI USA 73(2):607-11, FEB 76 Support source(s): CANCER INSTITUTE Corporate Address: NIH FOREIGN
2	216				0	29	68	59	60	1,4-DIAMINOBUTANE (PUTRESCINE), SPERMIDINE, AND SPERMINE. By: TABOR CW ; TABOR H In: ANNU REV BIOCHEM 45:285-306, 1976 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
3	165				4	31	53	40	37	CELL SURFACE PROTEIN PARTIALLY RESTORES MORPHOLOGY, ADHESIVENESS, AND CONTACT INHIBITION OF MOVEMENT TO TRANSFORMED FIBROBLASTS. By: YAMADA KM ; YAMADA SS ; PASTAN I In: PROC NATL ACAD SCI USA 73(4):1217-21, APR 76 Support source(s): CANCER INSTITUTE Corporate Address: NIH
4	151				1	45	38	40	27	BENZO(A)PYRENE DIOL EPOXIDES AS INTERMEDIATES IN NUCLEIC ACID BINDING IN VITRO AND IN VIVO. By: WEINSTEIN IB ; JEFFREY AM ; JENNETTE KW ; BLOBSTEIN SH ; HARVEY RG HARRIS C ; AUTRUP H ; KASAI H ; NAKANISHI K In: SCIENCE 193(4253):592-5, 13 AUG 76 Support source(s): CANCER INSTITUTE AMERICAN CANCER SOCIETY Corporate Address: COLUMBIA, NYC COLUMBIA U MED NIH
5	150				5	21	28	41	55	PREVENTION OF CHEMICAL CARCINOGENESIS BY VITAMIN A AND ITS SYNTHETIC ANALOGS (RETINOIDS). By: SPORN MB ; DUNLOP NM ; NEWTON DL ; SMITH JM In: FED PROC 35(6):1332-8, 1 MAY 76 Support source(s): CANCER INSTITUTE Corporate Address: NIH

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX A

Table 9 (Continued)

The Ten 1976 NIH Intramural Papers
Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
6	149				7	24	40	41	37	SERUM LIPOPROTEINS AND CORONARY HEART DISEASE IN A POPULATION STUDY OF HAWAII JAPANESE MEN. By: RHOADS GG ; GULBRANDSEN CL ; KAGAN A In: N ENGL J MED 294(6):293-8, 5 FEB 76 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: NIH
7	148				4	23	35	44	42	AN IMPROVED METHOD FOR ISOLATION OF H-2 AND IA ALLOANTIGENS WITH IMMUNOPRECIPITATION INDUCED BY PROTEIN A-BEARING STAPHYLOCOCCI. By: CULLEN SE ; SCHWARTZ BD In: J IMMUNOL 117(1):136-42, JUL 76 Support source(s): CANCER INSTITUTE Corporate Address: NIH
8	143				7	22	43	32	39	SITE-SITE INTERACTIONS AMONG INSULIN RECEPTORS. CHARACTERIZATION OF THE NEGATIVE COOPERATIVITY. By: DEMEYTS P ; BAINCO AR ; ROTH J In: J BIOL CHEM 241(7):1877-88, 10 APR 76 Support source(s): ARTHR & METABOL DIS FOGARTY INTERNATL CENTER AMERICAN DIABETES ASSOC Corporate Address: NIH
9	140				1	14	45	36	44	MEMBRANE RECEPTORS FOR HORMONES AND NEUROTRANSMITTERS. By: KAHN CR In: J CELL BIOL 70(2 PT 1):261-86, AUG 76 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
10	138				3	18	23	42	52	THE STRUCTURE-ACTIVITY RELATIONS OF SYNTHETIC PEPTIDES AS CHEMOTACTIC FACTORS AND INDUCERS OF LYSOSOMAL SECRETION FOR NEUTROPHILS. By: SHOWELL HJ ; FREER RJ ; ZIGMOND SH ; SCHIFFMANN E ; ASWANIKUMAR S CORCORAN B ; BECKER EL In: J EXP MED 143(5):1154-69, 1 MAY 76 Support source(s): ALLERG & INFECT DISEASES HEART,LUNG, & BLOOD INSTITUTE AMERICAN HEART ASSOC Corporate Address: YALE U MED NIH UNIDENTIFIED

APPENDIX A

Table 10

The Ten 1977 NIH Intramural Papers Most Highly Cited in 1977-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
1	175					9	47	63	56	A NEW CLASS OF MURINE LEUKEMIA VIRUS ASSOCIATED WITH DEVELOPMENT OF SPONTANEOUS LYMPHOMAS. By: HARTLEY JW ; WOLFORD NK ; OLD LJ ; ROWE WP In: PROC NATL ACAD SCI USA 74(2):789-92, FEB 77 Support source(s): CANCER INSTITUTE Corporate Address: SLOAN-KTRG CANC RES INST, NY NIH
2	167					1	36	61	69	HIGH DENSITY LIPOPROTEIN AS A PROTECTIVE FACTOR AGAINST CORONARY HEART DISEASE. THE FRAMINGHAM STUDY. By: GORDON T ; CASTELLI WP ; HJORTLAND MC ; KANNEL WB ; DAWBER TR In: AM J MED 62(5):707-14, MAY 77 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: NIH
3	124					2	28	49	45	HDL CHOLESTEROL AND OTHER LIPIDS IN CORONARY HEART DISEASE. THE COOPERATIVE LIPOPROTEIN PHENOTYPING STUDY. By: CASTELLI WP ; DOYLE JT ; GORDON T ; HAMES CG ; HJORTLAND MC HULLEY SB ; KAGAN A ; ZUKEL WJ In: CIRCULATION 55(5):767-72, MAY 77 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: INST MED SCI, SF N Y S DEP HLTH, ALB NIH
4	116					3	23	47	43	REAL-TIME RADIONUCLIDE CINEANGIOGRAPHY IN THE NONINVASIVE EVALUATION OF GLOBAL AND REGIONAL LEFT VENTRICULAR FUNCTION AT REST AND DURING EXERCISE IN PATIENTS WITH CORONARY-ARTERY DISEASE. By: BORER JS ; BACHARACH SL ; GREEN MV ; KENT KM ; EPSTEIN SE JOHNSTON GS In: N ENGL J MED 296(15):839-44, 14 APR 77 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: NIH
5	108					0	25	45	38	BIOCHEMICAL EVIDENCE THAT MCF MURINE LEUKEMIA VIRUSES ARE ENVELOPE (ENV) GENE RECOMBINANTS. By: ELDER JH ; GAUTSCH JW ; JENSEN FC ; LERNER RA ; HARTLEY JW ; ROWE WP In: PROC NATL ACAD SCI USA 74(10):4676-80, OCT 77 Support source(s): ALLERG & INFECT DISEASES Corporate Address: SCRIPPS CLINIC NIH

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*BID-SCI journal set citing BID-MEDLINE papers.

Table 10 (Continued)

The Ten 1977 NIH Intramural Papers Most Highly Cited in 1977-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
6	104					13	26	34	31	NATURAL CYTOTOXIC REACTIVITY OF HUMAN LYMPHOCYTES AGAINST A MYELOID CELL LINE: CHARACTERIZATION OF EFFECTOR CELLS. By: WEST WH ; CANNON GB ; KAY HD ; BONNARD GD ; HERBERMAN RB In: J IMMUNOL 118(1):355-61, JAN 77 Support source(s): CANCER INSTITUTE Corporate Address: NIH
7	96					16	38	30	12	BENZO A PYRENE 7,8-DIHYDRODIOL IS MORE CARCINOGENIC THAN BENZO A PYRENE IN NEWBORN MICE. By: KAPITULNIK J ; LEVIN W ; CONNEY AH ; YAGI H ; JERINA DM In: NATURE 266(5600):378-80, 24 MAR 77 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH UNIDENTIFIED
8	92					2	24	33	33	RAPID ANALYSIS OF AMINO ACID PHENYLTHIOHYDANTOINS BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY. By: ZIMMERMAN CL ; APPELLA E ; PISANO JJ In: ANAL BIOCHEM 77(2):569-73, FEB 77 Support source(s): HEART,LUNG, & BLOOD INSTITUTE Corporate Address: NIH
9	90					2	41	35	12	NOVEL MECHANISM FOR RNA MATURATION: THE LEADER SEQUENCES OF SIMIAN VIRUS 40 MRNA ARE NOT TRANSCRIBED ADJACENT TO THE CODING SEQUENCES. By: ALONI Y ; DHAR R ; LAUB O ; HOROWITZ M ; KHOURY G In: PROC NATL ACAD SCI USA 74(9):3686-90, SEP 77 Support source(s): CANCER INSTITUTE Corporate Address: NIH FOREIGN
10	82					2	21	31	28	A FUNCTIONAL COMPARISON OF HUMAN FC-RECEPTOR-BEARING LYMPHOCYTES ACTIVE IN NATURAL CYTOTOXICITY AND ANTIBODY-DEPENDENT CELLULAR CYTOTOXICITY. By: KAY HD ; BONNARD GD ; WEST WH ; HERBERMAN RB In: J IMMUNOL 118(6):2058-66, JUN 77 Support source(s): CANCER INSTITUTE Corporate Address: NIH

APPENDIX B

In Appendix B the 10 BID-MEDLINE papers published each year from 1973 to 1977 that were most highly cited in 1973-80 BID-SCI journals are listed in four categories: (1) U.S.-authored and -supported papers, (2) U.S. papers with non-Federal support, (3) U.S. papers with support unacknowledged, and (4) foreign papers. Papers published in 1978, 1979, and 1980 are not included, as they have fewer than three full years of citations attributed to them (by 1980). The lists include information on rank of citation frequency, the number of citations received annually from 1973 to 1980, a reference to each paper listed, acknowledged support sources, and authors' affiliations.

APPENDIX B

Table 1

The Ten 1973 U.S.-Authored and -Supported Papers Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	821	2	53	104	112	144	153	140	113	ANALYSIS OF BACTERIOPHAGE T7 EARLY RNAS AND PROTEINS ON SLAB GELS. By: STUDIER FW In: J MOL BIOL 79(2):237-48, 15 SEP 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: BROOKHVN LABS
2	598	0	64	81	95	102	95	94	67	DETECTION OF TWO RESTRICTION ENDONUCLEASE ACTIVITIES IN HAEMOPHILUS PARAINFLUENZAE USING ANALYTICAL AGAROSE--ETHIDIUM BROMIDE ELECTROPHORESIS. By: SHARP PA ; SUGDEN B ; SAMBROOK J In: BIOCHEMISTRY 12(16):3055-63, 31 JUL 73 Support source(s): CANCER INSTITUTE Corporate Address: COLD SP HRBR LAB
3	509	1	18	43	88	92	92	106	69	EFFICIENT TRANSLATION OF TOBACCO MOSAIC VIRUS RNA AND RABBIT GLOBIN 9S RNA IN A CELL-FREE SYSTEM FROM COMMERCIAL WHEAT GERM. By: ROBERTS BE ; PATERSON BM In: PROC NATL ACAD SCI USA 70(8):2330-4, AUG 73 Support source(s): NATL SCIENCE FOUNDATION Corporate Address: FOREIGN
4	460	3	24	70	74	78	77	61	73	MICROTUBULE ASSEMBLY IN THE ABSENCE OF ADDED NUCLEOTIDES. By: SHELANSKI ML ; GASKIN F ; CANTOR CR In: PROC NATL ACAD SCI USA 70(3):765-8, MAR 73 Support source(s): HEART,LUNG, & BLOOD INSTITUTE NEUROL DISEASES & STROKE GENERAL MEDICAL SCIENCES Corporate Address: COLUMBIA, NYC NIH
5	441	0	32	56	80	78	81	65	49	CARCINOGENS ARE MUTAGENS: A SIMPLE TEST SYSTEM COMBINING LIVER HOMOGENATES FOR ACTIVATION AND BACTERIA FOR DETECTION. By: AMES BN ; DURSTON WE ; YAMASAKI E ; LEE FD In: PROC NATL ACAD SCI USA 70(8):2281-5, AUG 73 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) Corporate Address: U CAL, BERKLY
6	412	5	30	46	61	72	64	72	62	FLUOROMETRIC ASSAY OF PROTEINS IN THE NANOGRAM RANGE. By: B OHLEN P ; STEIN S ; DAIRMAN W ; UDENFRIEND S In: ARCH BIOCHEM BIOPHYS 155(1):213-20, MAR 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 1 (Continued)

The Ten 1973 U.S.-Authored and -Supported Papers Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
7	396	5	43	42	66	73	62	48	57	CELLULAR LOCALIZATION OF AN EPSTEIN-BARR VIRUS (EBV)-ASSOCIATED COMPLEMENT-FIXING ANTIGEN IN PRODUCER AND NON-PRODUCER LYMPHOBLASTOID CELL LINES. By: REEDMAN BM ; KLEIN G In: INT J CANCER 11(3):499-520, MAY 73 Support source(s): CANCER INSTITUTE Corporate Address: FOREIGN
8	364	14	41	57	52	49	57	51	43	HYPOTHALAMIC POLYPEPTIDE THAT INHIBITS THE SECRETION OF IMMUNOREACTIVE PITUITARY GROWTH HORMONE. By: BRAZEAU P ; VALE W ; BURGUS R ; LING N ; BUTCHER M ; RIVIER J GUILLEMIN R In: SCIENCE 179(68):77-9, 5 JAN 73 Support source(s): PRIVATE NON-PROFIT PRIVATE FOR PROFIT Corporate Address: SALK INST BIOL
9	339	2	49	53	58	53	51	42	31	THE BIOCHEMISTRY OF PLANT LECTINS (PHYTOHEMAGGLUTININS). By: LIS H ; SHARON N In: ANNU REV BIOCHEM 42(0):541-74, 1973 Support source(s): LIBRARY OF MEDICINE NATL INSTITUTE OF HEALTH-GENL DEPT OF AGRICULTURE Corporate Address: FOREIGN
10	331	9	31	47	48	54	52	38	52	OPIATE RECEPTOR: DEMONSTRATION IN NERVOUS TISSUE. By: PERT CB ; SNYDER SH In: SCIENCE 179(77):1011-4, 9 MAR 73 Support source(s): PRIVATE FOR PROFIT Corporate Address: JOHNS HOPKINS MED

APPENDIX B

Table 2

The Ten 1974 U.S.-Authored and -Supported Papers Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	1668		2	22	101	193	313	505	532	A FILM DETECTION METHOD FOR TRITIUM-LABELLED PROTEINS AND NUCLEIC ACIDS IN POLYACRYLAMIDE GELS. By: BONNER WM ; LASKEY RA In: EUR J BIOCHEM 46(1):83-8, 1 JUL 74 Support source(s): PRIVATE NON-PROFIT ARTHRITIS FOUNDATION Corporate Address: FOREIGN
2	649		8	30	81	96	125	133	176	A HIGHLY SENSITIVE ADENYLATE CYCLASE ASSAY. By: SALOMON Y ; LONDOS C ; RODBELL M In: ANAL BIOCHEM 58(2):541-8, APR 74 Support source(s): ARTHR & METABOL DIS DENTAL RESEARCH Corporate Address: NIH
3	466		4	40	89	88	93	87	65	THE ORGANIZATION OF PROTEINS IN THE HUMAN RED BLOOD CELL MEMBRANE. A REVIEW. By: STECK TL In: J CELL BIOL 62(1):1-19, JUL 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CHIC PRITZ MED
4	376		1	42	96	67	61	61	48	THE MOLECULAR ORGANIZATION OF MEMBRANES. By: SINGER SJ In: ANNU REV BIOCHEM 43(0):805-33, 1974 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CAL, SAN DIEGO
5	375		0	11	48	64	79	91	82	A SIMPLIFIED METHOD FOR CYANOGEN BROMIDE ACTIVATION OF AGAROSE FOR AFFINITY CHROMATOGRAPHY. By: MARCH SC ; PARIKH I ; CUATRECASAS P In: ANAL BIOCHEM 60(1):149-52, JUL 74 Support source(s): ARTHR & METABOL DIS GENERAL MEDICAL SCIENCES Corporate Address: JOHNS HOPKINS MED
6	346		5	51	71	98	54	47	20	SPHEROID CHROMATIN UNITS (V BODIES). By: OLINS AL ; OLINS DE In: SCIENCE 183(122):330-2, 25 JAN 74 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) GENERAL MEDICAL SCIENCES Corporate Address: U TENN, KNOXVLL OAK RIDGE LABS

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 2 (Continued)

The Ten 1974 U.S.-Authored and -Supported Papers Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
7	344		11	44	63	67	72	48	39	PREDICTION OF PROTEIN CONFORMATION. By: CHOU PY ; FASMAN GD In: BIOCHEMISTRY 13(2):222-45, 15 JAN 74 Support source(s): GENERAL MEDICAL SCIENCES NATL SCIENCE FOUNDATION AMERICAN HEART ASSOC Corporate Address: BRANDEIS U, WALT
8	328		15	59	58	75	50	42	29	FEMALE STEROID HORMONES AND TARGET CELL NUCLEI. By: O'MALLEY BW ; MEANS AR In: SCIENCE 183(125):610-20, 15 FEB 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: BAYLOR U, HOUSTON (MED)
9	318		3	42	58	61	53	62	39	ARENE OXIDES: A NEW ASPECT OF DRUG METABOLISM. By: JERINA DM ; DALY JW In: SCIENCE 185(151):573-82, 16 AUG 74 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
10	314		3	28	39	49	67	68	60	INSULIN-DEPENDENT REGULATION OF INSULIN RECEPTOR CONCENTRATIONS: A DIRECT DEMONSTRATION IN CELL CULTURE. By: GAVIN JR 3D ; ROTH J ; NEVILLE DM JR ; MEYTS P DE ; BUELL DN In: PROC NATL ACAD SCI USA 71(1):84-8, JAN 74 Support source(s): ARTHR & METABOL DIS CANCER INSTITUTE FOGARTY INTERNATL CENTER Corporate Address: NIH NIMH

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Table 3

The Ten 1975 U.S.-Authored and -Supported Papers Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	1028			3	40	105	178	309	393	HIGH RESOLUTION TWO-DIMENSIONAL ELECTROPHORESIS OF PROTEINS. By: O'FARRELL PH In: J BIOL CHEM 250(10):4007-21, 25 MAY 75 Support source(s): NATL SCIENCE FOUNDATION Corporate Address: U COLO, BOULDER
2	651			0	33	92	141	195	190	METHODS FOR DETECTING CARCINOGENS AND MUTAGENS WITH THE SALMONELLA/MAMMALIAN-MICROSOME MUTAGENICITY TEST. By: AMES BN ; MCCANN J ; YAMASAKI E In: MUTAT RES 31(6):347-64, DEC 75 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) Corporate Address: U CAL, BERKLY
3	554			0	9	34	93	201	217	RAPID ISOLATION OF ANTIGENS FROM CELLS WITH A STAPHYLOCOCCAL PROTEIN A-ANTIBODY ADSORBENT: PARAMETERS OF THE INTERACTION OF ANTIBODY-ANTIGEN COMPLEXES WITH PROTEIN A. By: KESSLER SW In: J IMMUNOL 115(6):1617-24, DEC 75 Support source(s): CANCER INSTITUTE Corporate Address: UCLA MED SCH
4	535			0	91	132	121	101	90	IDENTIFICATION OF TWO RELATED PENTAPEPTIDES FROM THE BRAIN WITH POTENT OPIATE AGONIST ACTIVITY. By: HUGHES J ; SMITH TW ; KOSTERLITZ HW ; FOTHERGILL LA ; MORGAN BA MORRIS HR In: NATURE 258(5536):577-80, 18 DEC 75 Support source(s): NATL INST DRUG ABUSE (NIDA) FOREIGN GOVERNMENT Corporate Address: FOREIGN
5	521			0	40	101	116	154	110	DETECTION OF CARCINOGENS AS MUTAGENS IN THE SALMONELLA/MICROSOME TEST: ASSAY OF 300 CHEMICALS. By: MCCANN J ; CHOI E ; YAMASAKI E ; AMES BN In: PROC NATL ACAD SCI USA 72(12):5135-9, DEC 75 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) AMERICAN CANCER SOCIETY Corporate Address: U CAL, BERKLY

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 3 (Continued)

The Ten 1975 U.S.-Authored and -Supported Papers Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	475			2	14	76	103	151	129	TRANSFER OF PROTEINS ACROSS MEMBRANES. I. PRESENCE OF PROTEOLYTICALLY PROCESSED AND UNPROCESSED NASCENT IMMUNOGLOBULIN LIGHT CHAINS ON MEMBRANE-BOUND RIBOSOMES OF MURINE MYELOMA. By: BLOBEL G ; DOBBERSTEIN B In: J CELL BIOL 67(3):835-51, DEC 75 Support source(s): CANCER INSTITUTE Corporate Address: ROCKFLR U, NY
7	333			5	60	72	62	66	68	FUNCTIONAL SUBCLASSES OF T-LYMPHOCYTES BEARING DIFFERENT LY ANTIGENS. I. THE GENERATION OF FUNCTIONALLY DISTINCT T-CELL SUBCLASSES IS A DIFFERENTIATIVE PROCESS INDEPENDENT OF ANTIGEN. By: CANTOR H ; BOYSE EA In: J EXP MED 141(6):1376-89, 1 JUN 75 Support source(s): CANCER INSTITUTE ALLERG & INFECT DISEASES Corporate Address: CHILDRENS CANC RES FDN SLOAN-KTRG CANC RES INST, NY
8	312			4	33	49	65	80	81	INTRACELLULAR ASPECTS OF THE PROCESS OF PROTEIN SYNTHESIS. By: PALADE G In: SCIENCE 189(4200):347-58, 1 AUG 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: YALE U MED
9	303			1	36	70	53	86	57	PROTEIN PHOSPHORYLATION. By: RUBIN CS ; ROSEN OM In: ANNU REV BIOCHEM 44:831-87, 1975 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: ALB EINST, YESHIVA
10	295			2	23	39	55	77	99	NUCLEOTIDE SEQUENCE OF THE RIGHTWARD OPERATOR OF PHAGE LAMBDA. By: MANIATIS T ; JEFFREY A ; KLEID DG In: PROC NATL ACAD SCI USA 72(3):1184-8, MAR 75 Support source(s): NATL SCIENCE FOUNDATION NATL INSTITUTE OF HEALTH-GENL Corporate Address: HARVARD U, CMBRG

APPENDIX B

Table 4

The Ten 1976 U.S.-Authored and -Supported Papers Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
1	1077				0	30	140	360	547	A RAPID AND SENSITIVE METHOD FOR THE QUANTITATION OF MICROGRAM QUANTITIES OF PROTEIN UTILIZING THE PRINCIPLE OF PROTEIN-DYE BINDING. By: BRADFORD MM In: ANAL BIOCHEM 72:248-54, 7 MAY 76 Support source(s): CHILD HEALTH & HUMAN DEV FORD FOUNDATION Corporate Address: U GA, ATHENS
2	280				22	62	74	65	57	SURFACE MODULATION IN CELL RECOGNITION AND CELL GROWTH. By: EDELMAN GM In: SCIENCE 192(4236):218-26, 16 APR 76 Support source(s): ALLERG & INFECT DISEASES ARTHR & METABOL DIS CHILD HEALTH & HUMAN DEV Corporate Address: ROCKFLR U, NY
3	253				3	41	70	71	68	CELL SURFACE PROTEINS AND MALIGNANT TRANSFORMATION. By: HYNES RO In: BIOCHIM BIOPHYS ACTA 458(1):73-107, 30 APR 76 Support source(s): CANCER INSTITUTE Corporate Address: MIT, CAMBRIDGE
4	250				16	49	72	60	53	TRANSMEMBRANE CONTROL OF THE RECEPTORS ON NORMAL AND TUMOR CELLS. I. CYTOPLASMIC INFLUENCE OVER SURFACE COMPONENTS. By: NICOLSON GL In: BIOCHIM BIOPHYS ACTA 457(1):57-108, 13 APR 76 Support source(s): CANCER BIOL & DIAG - CANC INST NATL SCIENCE FOUNDATION CANCER INSTITUTE Corporate Address: U CAL, IRVINE SALK INST BIOL
5	236				4	43	58	74	57	THE ROLE OF POLYPRENOL-LINKED SUGARS IN GLYCOPROTEIN SYNTHESIS. By: WAECHTER CJ ; LENNARZ WJ In: ANNU REV BIOCHEM 45:95-112, 1976 Support source(s): NEUROL DISEASES & STROKE UNIV+MED SCHOOLS(STATE) ALLERG & INFECT DISEASES Corporate Address: JOHNS HOPKINS MED U MD, BALTIMORE (MED)

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B
Table 4 (Continued)

The Ten 1976 U.S.-Authored and -Supported Papers Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	229				1	58	46	60	64	CHROMOSOMAL SUBUNITS IN ACTIVE GENES HAVE AN ALTERED CONFORMATION. By: WEINTRAUB H ; GROUDINE M In: SCIENCE 193(4256):848-56, 3 SEP 76 Support source(s): NATL SCIENCE FOUNDATION AMERICAN CANCER SOCIETY Corporate Address: PRINCETON U
7	227				21	67	49	52	38	IDENTIFICATION OF MUTAGENIC METABOLITES OF BENZO(A)PYRENE IN MAMMALIAN CELLS. By: HUBERMAN E ; SACHS L ; YANG SK ; GELBOIN V In: PROC NATL ACAD SCI USA 73(2):607-11, FEB 76 Support source(s): CANCER INSTITUTE Corporate Address: NIH FOREIGN
8	216				0	29	68	59	60	1,4-DIAMINOBUTANE (PUTRESCINE), SPERMIDINE, AND SPERMINE. By: TABOR CW ; TABOR H In: ANNU REV BIOCHEM 45:285-306, 1976 Support source(s): ARTHR & METABOL DIS Corporate Address: NIH
9	214				0	30	56	62	66	INTRACELLULAR PROTEIN DEGRADATION IN MAMMALIAN AND BACTERIAL CELLS: PART 2. By: GOLDBERG AL ; ST. JOHN AC In: ANNU REV BIOCHEM 45:747-803, 1976 Support source(s): NEUROL DISEASES & STROKE MUSCULAR DYSTROPHY ASSOC Corporate Address: HARVARD MED
10	212				2	19	46	93	52	COMPARATIVE ASPECTS OF GLYCOPROTEIN STRUCTURE. By: KORNFELD R ; KORNFELD S In: ANNU REV BIOCHEM 45:217-37, 1976 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: WASHINGTON U MED

APPENDIX B

Table 5

The Ten 1977 U.S.-Authored and -Supported Papers Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	742					64	175	234	269	A NEW METHOD FOR SEQUENCING DNA. By: MAXAM AM ; GILBERT W In: PROC NATL ACAD SCI USA 74(2):560-4, FEB 77 Support source(s): GENERAL MEDICAL SCIENCES AMERICAN CANCER SOCIETY Corporate Address: HARVARD U, CMBRG
2	432					10	69	169	184	PEPTIDE MAPPING BY LIMITED PROTEOLYSIS IN SODIUM DODECYL SULFATE AND ANALYSIS BY GEL ELECTROPHORESIS. By: CLEVELAND DW ; FISCHER SG ; KIRSCHNER MW ; LAEMMLI UK In: J BIOL CHEM 252(3):1102-6, 10 FEB 77 Support source(s): CANCER INSTITUTE GENERAL MEDICAL SCIENCES NATL SCIENCE FOUNDATION Corporate Address: PRINCETON U
3	296					9	39	104	144	LABELING DEOXYRIBONUCLEIC ACID TO HIGH SPECIFIC ACTIVITY IN VITRO BY NICK TRANSLATION WITH DNA POLYMERASE I. By: RIGBY PW ; DIECKMANN M ; RHODES C ; BERG P In: J MOL BIOL 113(1):237-51, 15 JUN 77 Support source(s): GENERAL MEDICAL SCIENCES AMERICAN CANCER SOCIETY Corporate Address: STANFORD U MED
4	242					16	59	87	80	ANALYSIS OF RESTRICTION FRAGMENTS OF T7 DNA AND DETERMINATION OF MOLECULAR WEIGHTS BY ELECTROPHORESIS IN NEUTRAL AND ALKALINE GELS. By: MCDONELL MW ; SIMON MN ; STUDIER FW In: J MOL BIOL 110(1):119-46, 15 FEB 77 Support source(s): GENERAL MEDICAL SCIENCES Corporate Address: BROOKHVN LABS
5	240					3	47	92	98	FUNCTIONAL ANALYSIS OF TWO HUMAN T-CELL SUBPOPULATIONS: HELP AND SUPPRESSION OF B-CELL RESPONSES BY T CELLS BEARING RECEPTORS FOR IGM OR IGG. By: MORETTA L ; WEBB SR ; GROSSI CE ; LYDYARD PM ; COOPER MD In: J EXP MED 146(1):184-200, 1 JUL 77 Support source(s): CANCER INSTITUTE RESEARCH RESOURCES - NIH Corporate Address: U ALABAMA, BRMGHA U ALAB MED, BRMGH

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 5 (Continued)

The Ten 1977 U.S.-Authored and -Supported Papers Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
5	240					9	62	83	86	COMMON PRECURSOR TO CORTICOTROPINS AND ENDORPHINS. By: MAINS RE ; EIPPER BA ; LING N In: PROC NATL ACAD SCI USA 74(7):3014-8, JUL 77 Support source(s): ARTHR & METABOL DIS RESEARCH RESOURCES - NIH CHILD HEALTH & HUMAN DEV Corporate Address: SALK INST BIOL U COLO MED CTR
7	228					12	49	80	87	STRUCTURE OF CHROMATIN. By: KORNBERG RD In: ANNU REV BIOCHEM 46:931-54, 1977 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: HARVARD MED
8	184					11	62	62	49	MEMBRANE ASYMMETRY. By: ROTHMAN JE ; LENARD J In: SCIENCE 195(4280):743-53, 25 FEB 77 Support source(s): ALLERG & INFECT DISEASES NATL SCIENCE FOUNDATION Corporate Address: MIT, CAMBRIDGE RUTGERS U, N BRUN
9	181					6	29	79	67	THE LOW-DENSITY LIPOPROTEIN PATHWAY AND ITS RELATION TO ATHEROSCLEROSIS. By: GOLDSTEIN JL ; BROWN MS In: ANNU REV BIOCHEM 46:897-930, 1977 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U TEX, COMB MED
10	175					9	47	63	56	A NEW CLASS OF MURINE LEUKEMIA VIRUS ASSOCIATED WITH DEVELOPMENT OF SPONTANEOUS LYMPHOMAS. By: HARTLEY JW ; WOLFORD NK ; OLD LJ ; ROWE WP In: PROC NATL ACAD SCI USA 74(2):789-92, FEB 77 Support source(s): CANCER INSTITUTE Corporate Address: SLOAN-KTRG CANC RES INST, NY NIH

APPENDIX B

Table 6

The Ten 1973 U.S. Papers with Non-Federal Support Most Highly Cited in 1973-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
1	364	14	41	57	52	49	57	51	43	HYPOTHALAMIC POLYPEPTIDE THAT INHIBITS THE SECRETION OF IMMUNOREACTIVE PITUITARY GROWTH HORMONE. By: BRAZEAU P ; VALE W ; BURGUS R ; LING N ; BUTCHER M ; RIVIER J GUILLEMIN R In: SCIENCE 179(68):77-9, 5 JAN 73 Support source(s): PRIVATE NON-PROFIT PRIVATE FOR PROFIT Corporate Address: SALK INST BIOL
2	331	9	31	47	48	54	52	38	52	OPIATE RECEPTOR: DEMONSTRATION IN NERVOUS TISSUE. By: PERT CB ; SNYDER SH In: SCIENCE 179(77):1011-4, 9 MAR 73 Support source(s): PRIVATE FOR PROFIT Corporate Address: JOHNS HOPKINS MED
3	263	3	20	23	33	43	49	47	45	A HOMOLOGOUS RADIOIMMUNOASSAY FOR HUMAN PROLACTIN. By: SINHA YN ; SELBY FW ; LEWIS UJ ; VANDERLAAN WP In: J CLIN ENDOCRINOL METAB 36(3):509-16, MAR 73 Support source(s): ARTHR & METABOL DIS AMERICAN CANCER SOCIETY Corporate Address: SCRIPPS CLINIC
4	246	5	23	23	35	43	40	31	46	AN ENZYMATIC FUNCTION ASSOCIATED WITH TRANSFORMATION OF FIBROBLASTS BY ONCOGENIC VIRUSES. I. CHICK EMBRYO FIBROBLAST CULTURES TRANSFORMED BY AVIAN RNA TUMOR VIRUSES. By: UNKELESS JC ; TOBIA A ; OSSOWSKI L ; QUIGLEY JP ; RIFKIN DB REICH E In: J EXP MED 137(1):85-111, 1 JAN 73 Support source(s): AMERICAN CANCER SOCIETY CANCER INSTITUTE Corporate Address: ROCKFLR U, NY
5	221	11	48	41	35	36	21	16	13	COMBINED STUDIES OF COMPLEMENT RECEPTOR AND SURFACE IMMUNOGLOBULIN-BEARING CELLS AND SHEEP ERYTHROCYTE ROSETTE-FORMING CELLS IN NORMAL AND LEUKEMIC HUMAN LYMPHOCYTES. By: ROSS GD ; RABELLINO EM ; POLLEY MJ ; GREY HM In: J CLIN INVEST 52(2):377-85, FEB 73 Support source(s): ALLERG & INFECT DISEASES AMERICAN HEART ASSOC Corporate Address: SCRIPPS CLINIC NTL JWSH HP, DNVR

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 6 (Continued)

The Ten 1973 U.S. Papers with Non-Federal Support Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
6	217	1	34	39	40	38	29	17	19	LATERAL PHASE SEPARATIONS IN MEMBRANE LIPIDS AND THE MECHANISM OF SUGAR TRANSPORT IN ESCHERICHIA COLI. By: LINDEN CD ; WRIGHT KL ; MCCONNELL HM ; FOX CF In: PROC NATL ACAD SCI USA 70(8):2271-5, AUG 73 Support source(s): GENERAL MEDICAL SCIENCES ALLERG & INFECT DISEASES AMERICAN CANCER SOCIETY Corporate Address: UCLA STANFORD U
7	209	1	19	28	45	40	24	30	22	THYMUS-DERIVED ROSETTE-FORMING CELLS IN VARIOUS HUMAN DISEASE STATES: CANCER, LYMPHOMA, BACTERIAL AND VIRAL INFECTIONS, AND OTHER DISEASES. By: WYBRAN J ; FUDENBERG HH In: J CLIN INVEST 52(5):1026-32, MAY 73 Support source(s): CHILD HEALTH & HUMAN DEV PRIVATE FOR PROFIT AMERICAN CANCER SOCIETY Corporate Address: U CAL MED, S FRAN MT ZION MED CTR
8	208	3	12	34	40	31	28	24	36	STEREOSPECIFIC BINDING OF THE POTENT NARCOTIC ANALGESIC (3H) ETORPHINE TO RAT-BRAIN HOMOGENATE. By: SIMON EJ ; HILLER JM ; EDELMAN I In: PROC NATL ACAD SCI USA 70(7):1947-9, JUL 73 Support source(s): DEPT OF AGRICULTURE PRIVATE FOR PROFIT Corporate Address: NYU MED
9	206	3	20	30	34	43	27	24	25	AN IMPROVED SCINTILLATION COCKTAIL OF HIGH-SOLUBILIZING POWER. By: ANDERSON LE ; MCCLURE WO In: ANAL BIOCHEM 51(1):173-9, JAN 73 Support source(s): NEUROL DISEASES & STROKE OTHER FEDERAL GOVERNMENT PRIVATE FOR PROFIT Corporate Address: U ILL, URBANA
10	193	0	12	18	24	25	29	51	34	EXTERNAL LABELING OF CELL SURFACE GALACTOSE AND GALACTOSAMINE IN GLYCOLIPID AND GLYCOPROTEIN OF HUMAN ERYTHROCYTES. By: GAHMBERG CT. ; HAKOMORI SI In: J BIOL CHEM 248(12):4311-7, 25 JUN 73 Support source(s): CANCER INSTITUTE AMERICAN CANCER SOCIETY FOGARTY INTERNATL CENTER Corporate Address: U WASH MED

APPENDIX B

Table 7

The Ten 1974 U.S. Papers with Non-Federal Support Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
1	1668		2	22	101	193	313	505	532	A FILM DETECTION METHOD FOR TRITIUM-LABELLED PROTEINS AND NUCLEIC ACIDS IN POLYACRYLAMIDE GELS. By: BONNER WM ; LASKEY RA In: EUR J BIOCHEM 46(1):83-8, 1 JUL 74 Support source(s): PRIVATE NON-PROFIT ARTHRITIS FOUNDATION Corporate Address: FOREIGN
2	344		11	44	63	67	72	48	39	PREDICTION OF PROTEIN CONFORMATION. By: CHOU PY ; FASMAN GD In: BIOCHEMISTRY 13(2):222-45, 15 JAN 74 Support source(s): GENERAL MEDICAL SCIENCES NATL SCIENCE FOUNDATION AMERICAN HEART ASSOC Corporate Address: BRANDEIS U, WALT
3	245		8	10	20	31	48	63	65	MUSCARINIC CHOLINERGIC BINDING IN RAT BRAIN. By: YAMAMURA HI ; SNYDER SH In: PROC NATL ACAD SCI USA 71(5):1725-9, MAY 74 Support source(s): NATL INST MENTAL HEALTH JOHN HARTFORD FOUNDATION Corporate Address: JOHNS HOPKINS MED
4	237		1	35	58	36	41	38	28	MEMBRANE RECEPTORS. By: CUATRECASAS P In: ANNU REV BIOCHEM 43(0):169-214, 1974 Support source(s): ARTHR & METABOL DIS NATL SCIENCE FOUNDATION AMERICAN CANCER SOCIETY Corporate Address: JOHNS HOPKINS MED
5	228		6	45	55	62	21	27	12	CHROMATIN STRUCTURE; OLIGOMERS OF THE HISTONES. By: KORNBERG RD ; THOMAS JO In: SCIENCE 184(139):865-8, 24 MAY 74 Support source(s): PRIVATE NON-PROFIT Corporate Address: FOREIGN

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 7 (Continued)

The Ten 1974 U.S. Papers with Non-Federal Support Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
6	227		0	6	31	39	43	53	55	MAGNESIUM PRECIPITATION OF RIBONUCLEOPROTEIN COMPLEXES. EXPEDIENT TECHNIQUES FOR THE ISOLATION OF UNDERGRADED POLYSOMES AND MESSENGER RIBONUCLEIC ACID. By: PALMITER RD In: BIOCHEMISTRY 13(17):3606-15, 13 AUG 74 Support source(s): CHILD HEALTH & HUMAN DEV NATL SCIENCE FOUNDATION PRIVATE FOR PROFIT Corporate Address: HARVARD U, CMBRG
6	227		14	31	43	44	29	31	35	CONFORMATIONAL PARAMETERS FOR AMINO ACIDS IN HELICAL, BETA-SHEET, AND RANDOM COIL REGIONS CALCULATED FROM PROTEINS. By: CHOU PY ; FASMAN GD In: BIOCHEMISTRY 13(2):211-22, 15 JAN 74 Support source(s): GENERAL MEDICAL SCIENCES NATL SCIENCE FOUNDATION AMERICAN HEART ASSOC Corporate Address: BRANDEIS U, WALT
8	222		12	51	47	40	31	22	19	NONHISTONE CHROMOSOMAL PROTEINS AND GENE REGULATION. By: STEIN GS ; SPELSBERG TC ; KLEINSMITH LJ In: SCIENCE 183(127):817-24, 1 MAR 74 Support source(s): CANCER INSTITUTE NATL SCIENCE FOUNDATION AMERICAN CANCER SOCIETY Corporate Address: U FLA MED U MICH, ANN ARBR MAYO FDN, ROCH
9	208		2	21	32	30	33	53	37	BINDING AND DEGRADATION OF LOW DENSITY LIPOPROTEINS BY CULTURED HUMAN FIBROBLASTS. COMPARISON OF CELLS FROM A NORMAL SUBJECT AND FROM A PATIENT WITH HOMOZYGOUS FAMILIAL HYPERCHOLESTEROLEMIA. By: GOLDSTEIN JL ; BROWN MS In: J BIOL CHEM 249(16):5153-62, 25 AUG 74 Support source(s): AMERICAN HEART ASSOC GENERAL MEDICAL SCIENCES HEART,LUNG, & BLOOD INSTITUTE Corporate Address: U TEX, COMB MED

APPENDIX B

Table 7 (Continued)

The Ten 1974 U.S. Papers with Non-Federal
Support Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
9	208		3	32	51	39	36	28	19	DOPAMINE-SENSITIVE ADENYLATE CYCLASE IN MAMMALIAN BRAIN: A POSSIBLE SITE OF ACTION OF ANTIPSYCHOTIC DRUGS. By: CLEMENT-CORMIER YC ; KEBABIAN JW ; PETZOLD GL ; GREENGARD P In: PROC NATL ACAD SCI USA 71(4):1113-7, APR 74 Support source(s): NEUROL DISEASES & STROKE NATL INST MENTAL HEALTH PRIVATE NON-PROFIT Corporate Address: YALE U MED

Table 8

The Ten 1975 U.S. Papers with Non-Federal Support Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	521			0	40	101	116	154	110	DETECTION OF CARCINOGENS AS MUTAGENS IN THE SALMONELLA/MICROSOME TEST: ASSAY OF 300 CHEMICALS. By: MCCANN J ; CHOI E ; YAMASAKI E ; AMES BN In: PROC NATL ACAD SCI USA 72(12):5135-9, DEC 75 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) AMERICAN CANCER SOCIETY Corporate Address: U CAL, BERKLY
2	246			12	31	49	55	56	43	STUDIES ON THE CLEAVAGE OF BACTERIOPHAGE LAMBDA DNA WITH ECORI RESTRICTION ENDONUCLEASE. By: THOMAS M ; DAVIS RW In: J MOL BIOL 91(3):315-28, 25 JAN 75 Support source(s): GENERAL MEDICAL SCIENCES PRIVATE FOR PROFIT Corporate Address: STANFORD U MED
3	230			10	42	52	51	40	35	DETECTION OF CARCINOGENS AS MUTAGENS: BACTERIAL TESTER STRAINS WITH R FACTOR PLASMIDS. By: MCCANN J ; SPINGARN NE ; KOBORI J ; AMES BN In: PROC NATL ACAD SCI USA 72(3):979-83, MAR 75 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) AMERICAN CANCER SOCIETY Corporate Address: U CAL, BERKLY
4	214			1	27	46	39	52	49	THE SODIUM-POTASSIUM ADENOSINE TRIPHOSPHATASE: PHARMACOLOGICAL, PHYSIOLOGICAL AND BIOCHEMICAL ASPECTS. By: SCHWARTZ A ; LINDENMAYER GE ; ALLEN JC In: PHARMACOL REV 27(01):3-134, MAR 75 Support source(s): HEART,LUNG, & BLOOD INSTITUTE NATL INSTITUTE OF HEALTH-GENL AMERICAN HEART ASSOC Corporate Address: BAYLOR U, HOUSTON (MED) UNIDENTIFIED
5	203			3	51	37	36	49	27	BONE-MARROW TRANSPLANTATION (FIRST OF TWO PARTS). By: THOMAS E ; STORB R ; CLIFT RA ; FEFER A ; JOHNSON FL ; NEIMAN PE LERNER KG ; GLUCKSBERG H ; BUCKNER CD In: N ENGL J MED 292(16):832-43, 17 APR 75 Support source(s): CANCER INSTITUTE ALLERG & INFECT DISEASES AMERICAN CANCER SOCIETY Corporate Address: U WASH MED UNIDENTIFIED

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 8 (Continued)

The Ten 1975 U.S. Papers with Non-Federal
Support Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	170			4	24	35	45	32	30	CATECHOLAMINE-INDUCED SUBSENSITIVITY OF ADENYLATE CYCLASE ASSOCIATED WITH LOSS OF BETA-ADRENERGIC RECEPTOR BINDING SITES. By: MUKHERJEE C ; CARON MG ; LEFKOWITZ RJ In: PROC NATL ACAD SCI USA 72(5):1945-9, MAY 75 Support source(s): HEART,LUNG, & BLOOD INSTITUTE AMERICAN HEART ASSOC Corporate Address: DUKE MED
7	161			2	13	39	28	50	29	REGULATION OF TUMOR ANTIGEN SYNTHESIS BY SIMAIN VIRUS 40 GENE A. By: TEGTMEYER P ; SCHWARTZ M ; COLLINS JK ; RUNDELL K In: J VIROL 16(1):168-78, JUL 75 Support source(s): AMERICAN CANCER SOCIETY PRIVATE NON-PROFIT CANCER INSTITUTE Corporate Address: CASE-WSTRN U. CLE
8	149			0	30	44	34	20	21	IN VITRO CELL-MEDIATED IMMUNE RESPONSES TO THE MALE SPECIFIC(H-Y) ANTIGEN IN MICE. By: GORDON RD ; SIMPSON E ; SAMELSON LE In: J EXP MED 142(5):1108-20, 1 NOV 75 Support source(s): GENERAL MEDICAL SCIENCES UNIV+MED SCHOOLS(STATE) Corporate Address: FOREIGN
9	145			0	21	40	33	26	25	CONTROL OF GROWTH OF MAMMALIAN CELLS IN CELL CULTURE. By: HOLLEY RW In: NATURE 258(5535):487-90, 11 DEC 75 Support source(s): AMERICAN CANCER SOCIETY CANCER INSTITUTE NATL SCIENCE FOUNDATION Corporate Address: SALK INST BIOL
10	143			1	9	18	39	37	39	PROPERTIES OF GAMMA-AMINOBUTYRIC ACID (GABA) RECEPTOR BINDING IN RAT BRAIN SYNAPTIC MEMBRANE FRACTIONS. By: ENNA SJ ; SNYDER SH In: BRAIN RES 100(1):81-97, 12 DEC 75 Support source(s): NATL INST MENTAL HEALTH JOHN HARTFORD FOUNDATION Corporate Address: JOHNS HOPKINS MED

APPENDIX B

Table 9

The Ten 1976 U.S. Papers with Non-Federal Support Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	1077				0	30	140	360	547	A RAPID AND SENSITIVE METHOD FOR THE QUANTITATION OF MICROGRAM QUANTITIES OF PROTEIN UTILIZING THE PRINCIPLE OF PROTEIN-DYE BINDING. By: BRADFORD MM In: ANAL BIOCHEM 72:248-54, 7 MAY 76 Support source(s): CHILD HEALTH & HUMAN DEV FORD FOUNDATION Corporate Address: U GA, ATHENS
2	236				4	43	58	74	57	THE ROLE OF POLYPRENOL-LINKED SUGARS IN GLYCOPROTEIN SYNTHESIS. By: WAECHTER CJ ; LENNARZ WJ In: ANNU REV BIOCHEM 45:95-112, 1976 Support source(s): NEUROL DISEASES & STROKE UNIV+MED SCHOOLS(STATE) ALLERG & INFECT DISEASES Corporate Address: JOHNS HOPKINS MED U MD, BALTIMORE (MED)
3	229				1	58	46	60	64	CHROMOSOMAL SUBUNITS IN ACTIVE GENES HAVE AN ALTERED CONFORMATION. By: WEINTRAUB H ; GROUDINE M In: SCIENCE 193(4256):848-56, 3 SEP 76 Support source(s): NATL SCIENCE FOUNDATION AMERICAN CANCER SOCIETY Corporate Address: PRINCETON U
4	214				0	30	56	62	66	INTRACELLULAR PROTEIN DEGRADATION IN MAMMALIAN AND BACTERIAL CELLS: PART 2. By: GOLDBERG AL ; ST. JOHN AC In: ANNU REV BIOCHEM 45:747-803, 1976 Support source(s): NEUROL DISEASES & STROKE MUSCULAR DYSTROPHY ASSOC Corporate Address: HARVARD MED
5	181				20	52	45	40	24	RECEPTOR-MEDIATED CONTROL OF CHOLESTEROL METABOLISM. By: BROWN MS ; GOLDSTEIN JL In: SCIENCE 191(4223):150-4, 16 JAN 76 Support source(s): HEART,LUNG, & BLOOD INSTITUTE GENERAL MEDICAL SCIENCES AMERICAN HEART ASSOC Corporate Address: U TEX, COMB MED

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 9 (Continued)

The Ten 1976 U.S. Papers with Non-Federal Support Most Highly Cited in 1976-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
6	180				14	51	46	36	33	ISOLATION AND STRUCTURE OF AN UNTRIAKONTAPEPTIDE WITH OPIATE ACTIVITY FROM CAMEL PITUITARY GLANDS. By: LI CH ; CHUNG D In: PROC NATL ACAD SCI USA 73(4):1145-8, APR 76 Support source(s): PRIVATE NON-PROFIT Corporate Address: U CAL MED, S FRAN
7	170				4	13	27	61	65	METHYLMERCURY AS A REVERSIBLE DENATURING AGENT FOR AGAROSE GEL ELECTROPHORESIS. By: BAILEY JM ; DAVIDSON N In: ANAL BIOCHEM 70(1):75-85, JAN 76 Support source(s): CANCER INSTITUTE PRIVATE NON-PROFIT Corporate Address: CALTECH, PASADENA
8	156				1	12	39	46	58	EFFICEINT TRANSCRIPTION OF RNA INTO DNA BY AVIAN SARCOMA VIRUS POLYMERASE. By: TAYLOR JM ; ILLMENSEE R ; SUMMERS J In: BIOCHIM BIOPHYS ACTA 442(3):324-30, 6SEP 76 Support source(s): CANCER INSTITUTE RESEARCH RESOURCES - NIH STATE,LOCAL,REG GOVT Corporate Address: INST CNCR RES, PHL
9	151				1	45	38	40	27	BENZO(A)PYRENE DIOL EPOXIDES AS INTERMEDIATES IN NUCLEIC ACID BINDING IN VITRO AND IN VIVO. By: WEINSTEIN IB ; JEFFREY AM ; JENNETTE KW ; BLOBSTEIN SH ; HARVEY RG HARRIS C ; AUTRUP H ; KASAI H ; NAKANISHI K In: SCIENCE 193(4253):592-5, 13 AUG 76 Support source(s): CANCER INSTITUTE AMERICAN CANCER SOCIETY Corporate Address: COLUMBIA, NYC COLUMBIA U MED NIH
10	148				3	26	37	42	40	DISTRIBUTION OF IA-LIKE MOLECULES ON THE SURFACE OF NORMAL AND LEUKEMIC HUMAN CELLS. By: SCHLOSSMAN SF ; CHESS L ; HUMPHREYS RE ; STROMINGER JL In: PROC NATL ACAD SCI USA 73(4):1288-92, APR 76 Support source(s): ALLERG & INFECT DISEASES CANCER INSTITUTE PRIVATE NON-PROFIT Corporate Address: HARVARD MED HARVARD U, CMBRG

APPENDIX B

Table 10

The Ten 1977 U.S. Papers with Non-Federal Support Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	742				*	64	175	234	269	A NEW METHOD FOR SEQUENCING DNA. By: MAXAM AM ; GILBERT W In: PROC NATL ACAD SCI USA 74(2):560-4, FEB 77 Support source(s): GENERAL MEDICAL SCIENCES AMERICAN CANCER SOCIETY Corporate Address: HARVARD U, CMBRG
2	296					9	39	104	144	LABELING DEOXYRIBONUCLEIC ACID TO HIGH SPECIFIC ACTIVITY IN VITRO BY NICK TRANSLATION WITH DNA POLYMERASE I. By: RIGBY PW ; DIECKMANN M ; RHODES C ; BERG P In: J MOL BIOL 113(1):237-51, 15 JUN 77 Support source(s): GENERAL MEDICAL SCIENCES AMERICAN CANCER SOCIETY Corporate Address: STANFORD U MED
3	168					13	69	59	27	SPLICED SEGMENTS AT THE 5' TERMINUS OF ADENOVIRUS 2 LATE MRNA. By: BERGET SM ; MOORE C ; SHARP PA In: PROC NATL ACAD SCI USA 74(8):3171-5, AUG 77 Support source(s): AMERICAN CANCER SOCIETY CANCER INSTITUTE Corporate Address: MIT, CAMBRIDGE
4	163					2	31	56	74	BINDING OF SOLUBLE FORM OF FIBROBLAST SURFACE PROTEIN, FIBRONECTIN, TO COLLAGEN. By: ENGVALL E ; RUOSLAHTI E In: INT J CANCER 20(1):1-5, 15 JUL 77 Support source(s): PRIVATE NON-PROFIT CANCER INSTITUTE Corporate Address: CITY HOPE MED CTR
5	146					2	38	49	57	BETA-ENDORPHIN AND ADRENOCORTICOTROPIN ARE SELECTED CONCOMITANTLY BY THE PITUITARY GLAND. By: GUILLEMIN R ; VARGO T ; ROSSIER J ; MINICK S ; LING N ; RIVIER C VALE W ; BLOOM F In: SCIENCE 197(4311):1367-9, 30 SEP 77 Support source(s): ARTHR & METABOL DIS CHILD HEALTH & HUMAN DEV PRIVATE NON-PROFIT Corporate Address: SALK INST BIOL

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 10 (Continued)

The Ten 1977 U.S. Papers with Non-Federal Support Most Highly Cited in 1977-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
6	144					1	5	48	90	METHOD FOR DETECTION OF SPECIFIC RNAS IN AGAROSE GELS BY TRANSFER TO DIAZOBENZYLOXYMETHYL-PAPER AND HYBRIDIZATION WITH DNA PROBES. By: ALWINE JC ; KEMP DJ ; STARK GR In: PROC NATL ACAD SCI USA 74(12):5350-4, DEC 77 Support source(s): CANCER INSTITUTE AMERICAN CANCER SOCIETY Corporate Address: STANFORD U MED
7	137					2	18	53	64	ENDOCYTOSIS. By: SILVERSTEIN SC ; STEINMAN RM ; COHN ZA In: ANNU REV BIOCHEM 46:669-722, 1977 Support source(s): AMERICAN HEART ASSOC ALLERG & INFECT DISEASES Corporate Address: ROCKFLR U, NY
8	120					1	24	45	50	PHOSPHODIESTERASE PROTEIN ACTIVATOR MIMICS RED BLOOD CELL CYTOPLASMIC ACTIVATOR OF (CA2+-MG2+)ATPASE. By: GOPINATH RM ; VINCENZI FF In: BIOCHEM BIOPHYS RES COMMUN 77(4):1203-9, 22 AUG 77 Support source(s): PRIVATE NON-PROFIT ARTHR & METABOL DIS Corporate Address: U WASH MED
9	110					6	12	32	60	SCREENING LAMBDAGT RECOMBINANT CLONES BY HYBRIDIZATION TO SINGLE PLAQUES IN SITU. By: BENTON WD ; DAVIS RW In: SCIENCE 196(4286):180-2, 8 APR 77 Support source(s): NATL SCIENCE FOUNDATION GENERAL MEDICAL SCIENCES PRIVATE NON-PROFIT Corporate Address: STANFORD U MED
10	109					2	22	43	42	PHOSPHOHEXOSYL COMPONENTS OF A LYSOSOMAL ENZYME ARE RECOGNIZED BY PINOCYTOSIS RECEPTORS ON HUMAN FIBROBLASTS. By: KAPLAN A ; ACHORD DT ; SLY WS In: PROC NATL ACAD SCI USA 74(5):2026-30, MAY 77 Support source(s): GENERAL MEDICAL SCIENCES PRIVATE NON-PROFIT Corporate Address: ST LOUIS U MED WASHINGTON U MED

APPENDIX B

Table 11

The Ten 1973 U.S. Papers with Support
Unacknowledged Most Highly Cited in 1973-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
1	821	2	53	104	112	144	153	140	113	ANALYSIS OF BACTERIOPHAGE T7 EARLY RNAS AND PROTEINS ON SLAB GELS. By: STUDIER FW In: J MOL BIOL 79(2):237-48, 15 SEP 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: BROOKHVN LABS
2	412	5	30	46	61	72	64	72	62	FLUOROMETRIC ASSAY OF PROTEINS IN THE NANOGRAM RANGE. By: B OHLEN P ; STEIN S ; DAIRMAN W ; UDENFRIEND S In: ARCH BIOCHEM BIOPHYS 155(1):213-20, MAR 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
3	238	1	8	29	52	43	47	37	21	THIN-LAYER CHROMATOGRAPHY OF SUB-NANOMOLE AMOUNTS OF PHENYLTHIOHYDANTOIN (PTH) AMINO ACIDS ON POLYAMIDE SHEETS. By: SUMMERS MR ; SMYTHERS GW ; OROSZLAN S In: ANAL BIOCHEM 53(2):624-8, JUN 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
4	222	0	3	23	39	32	36	54	35	A SIMPLIFIED METHOD FOR THE QUANTITATIVE ASSAY OF SMALL AMOUNTS OF PROTEIN IN BIOLOGIC MATERIAL. By: SCHACTERLE GR ; POLLACK RL In: ANAL BIOCHEM 51(2):654-5, FEB 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: TEMPLE U MED
5	215	0	46	56	36	27	26	15	9	BIOGENESIS OF MRNA: GENETIC REGULATION IN MAMMALIAN CELLS. By: DARNELL JE ; JELINEK WR ; MOLLOY GR In: SCIENCE 181(106):1215-21, 28 SEP 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: COLUMBIA, NYC
6	190	0	4	31	18	31	42	34	30	VOLTAGE CLAMP ANALYSIS OF ACETYLCHOLINE PRODUCED END-PLATE CURRENT FLUCTUATIONS AT FROG NEUROMUSCULAR JUNCTION. By: ANDERSON CR ; STEVENS CF In: J PHYSIOL (LOND) 235(3):655-91, DEC 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U WASH MED
7	166	8	51	41	21	17	12	11	5	SURFACE CHANGES IN TRANSFORMED CELLS DETECTED BY LECTINS. By: BURGER MM In: FED PROC 32(1):91-101, JAN 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: PRINCETON U

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 11 (Continued)

The Ten 1973 U.S. Papers with Support
Unacknowledged Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
8	161	0	7	12	18	29	28	37	30	A SIMPLE PROCEDURE FOR REMOVAL OF TRITON X-100 FROM PROTEIN SAMPLES. By: HOLLOWAY PW In: ANAL BIOCHEM 53(1):304-8, MAY 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U VA MED
9	140	0	8	23	15	16	22	21	35	IMPROVED ESTIMATION OF SECONDARY STRUCTURE IN RIBONUCLEIC ACIDS. By: TINOCO I JR ; BORER PN ; DENGLER B ; LEVIN MD ; UHLENBECK OC CROTHERS DM ; BRALLA J In: NATURE NEW BIOL 246(150):40-1, 14 NOV 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CAL, BERKLY YALE U, N HAVEN U ILL, URBANA
10	136	0	12	19	26	33	13	25	8	TOWARD MOLECULAR MECHANISMS OF DEVELOPMENTAL PROCESSES. By: RUTTER WJ ; PICTET RL ; MORRIS PW In: ANNU REV BIOCHEM 42:601-46, 1973 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CAL MED, S FRAN

APPENDIX B

Table 12

The Ten 1974 U.S. Papers with Support Unacknowledged Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	466		4	40	89	88	93	87	65	THE ORGANIZATION OF PROTEINS IN THE HUMAN RED BLOOD CELL MEMBRANE. A REVIEW. By: STECK TL In: J CELL BIOL 62(1):1-19, JUL 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CHIC PRITZ MED
2	376		1	42	96	67	61	61	48	THE MOLECULAR ORGANIZATION OF MEMBRANES. By: SINGER SJ In: ANNU REV BIOCHEM 43(0):805-33, 1974 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CAL, SAN DIEGO
3	328		15	59	58	75	50	42	29	FEMALE STEROID HORMONES AND TARGET CELL NUCLEI. By: O'MALLEY BW ; MEANS AR In: SCIENCE 183(125):610-20, 15 FEB 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: BAYLOR U, HOUSTON (MED)
4	194		1	13	26	38	42	43	31	IMMUNOLOGIC CHARACTERIZATION OF HUMAN MALIGNANT LYMPHOMAS. By: LUKES RJ ; COLLINS RD In: CANCER 34(4 SUPPL):SUPPL:1488-503, OCT 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: USC MED, LA
4	194		5	45	36	38	31	19	20	INTERACTION OF DRUGS WITH MICROTUBULE PROTEINS. By: WILSON L ; BAMBURG JR ; MIZEL SB ; GRISHAM LM ; CRESWELL KM In: FED PROC 33(2):158-66, FEB 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: STANFORD U MED
6	192		2	25	32	32	40	35	26	THE SODIUM-POTASSIUM ADENOSINETRIPHOSPHATASE. By: DAHL JL ; HOKIN LE In: ANNU REV BIOCHEM 43(0):327-56, 1974 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U WISC MED
7	189		8	30	40	44	36	25	6	A PROPOSED NOMENCLATURE FOR THE VIRION PROTEINS OF ONCOGENIC RNA VIRUSES. By: AUGUST JT ; BOLOGNESI DP ; FLEISSNER E ; GILDEN RV ; NOWINSKI RC In: VIROLOGY 60(2):595-600, AUG 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: SLOAN-KTRG CANC RES INST, NY DUKE MED UNIDENTIFIED

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 12 (Continued)

The Ten 1974 U.S. Papers with Support Unacknowledged Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
8	163		7	43	51	33	16	7	6	COMPUTERIZED AXIAL TOMOGRAPHY WITH THE EMI SCANNER. By: NEW PF ; SCOTT WR ; SCHNUR JA ; DAVIS KR ; TAVERAS JM In: RADIOLOGY 110(1):109-23, JAN 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: HARVARD MED MASS GEN HOSP, BOS
9	156		3	28	46	19	28	23	9	EUKARYOTIC MESSENGER RNA. By: BRAWERMAN G In: ANNU REV BIOCHEM 43(0):621-42, 1974 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: TUFTS MED, BOS
10	152		2	23	26	33	31	24	13	THE SELECTIVITY OF TRANSCRIPTION. By: CHAMBERLIN MJ In: ANNU REV BIOCHEM 43(0):721-75, 1974 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CAL, BERKLY

APPENDIX B

Table 13

The Ten 1975 U.S. Papers with Support Unacknowledged Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	312			4	33	49	65	80	81	INTRACELLULAR ASPECTS OF THE PROCESS OF PROTEIN SYNTHESIS. By: PALADE G In: SCIENCE 189(4200):347-58, 1 AUG 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: YALE U MED
2	303			1	36	70	53	86	57	PROTEIN PHOSPHORYLATION. By: RUBIN CS ; ROSEN OM In: ANNU REV BIOCHEM 44:831-87, 1975 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: ALB EINST, YESHIVA
3	247			1	26	55	66	66	33	CHEMICAL CARCINOGENESIS. By: HEIDELBERGER C In: ANNU REV BIOCHEM 44:79-121, 1975 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U WISC MED
4	237			0	43	64	49	47	34	FREEZE-ETCHING NOMENCLATURE. By: BRANTON D ; BULLIVANT S ; GILULA NB ; KARNOVSKY MJ ; MOOR H M UHLETHALER K ; NORTHCOTE DH ; PACKER L ; SATIR B ; SATIR P SPETH V ; STAEHLIN LA ; STEERE RL ; WEINSTEIN RS In: SCIENCE 190(4209):54-6, 3 OCT 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: HARVARD MED ROCKFLR U, NY FOREIGN
5	199			2	19	46	41	50	41	COMPLEMENT. By: M ULLER-EBERHARD HJ In: ANNU REV BIOCHEM 44:697-724, 1975 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: SCRIPPS CLINIC
6	175			19	57	42	26	24	7	METHYLATION-DEPENDENT TRANSLATION OF VIRAL MESSENGER RNAS IN VITRO. By: BOTH GW ; BANERJEE AK ; SHATKIN AJ In: PROC NATL ACAD SCI USA 72(3):1189-93, MAR 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED

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*BID-SCI journal set citing BID-MEDLARS papers.

APPENDIX B

Table 13 (Continued)

The Ten 1975 U.S. Papers with Support
Unacknowledged Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
7	168			15	58	45	25	19	6	5'-TERMINAL 7-METHYLGUANOSINE IN EUKARYOTIC MRNA IS REQUIRED FOR TRANSLATION. By: MUTHUKRISHNAN S ; BOTH GW ; FURUICHI Y ; SHATKIN AJ In: NATURE 255(5503):33-7, 1 MAY 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
8	154			1	12	26	37	39	39	REGENERATION OF AMINO ACIDS FROM THIAZOLINONES FORMED IN THE EDMAN DEGRADATION. By: MENDEZ E ; LAI CY In: ANAL BIOCHEM 68(1):47-53, SEP 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
9	153			2	13	36	31	31	40	SUPEROXIDE DISMUTASES. By: FRIDOVICH I In: ANNU REV BIOCHEM 44:147-59, 1975 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: DUKE MED
10	141			27	52	33	10	11	8	REOVIRUS MESSENGER RNA CONTAINS A METHYLATED, BLOCKED 5'-TERMINAL STRUCTURE: M-7G(5')PPP(5')G-MPCP-. By: FURUICHI Y ; MORGAN M ; MUTHUKRISHNAN S ; SHATKIN AJ In: PROC NATL ACAD SCI USA 72(1):362-6, JAN 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED

APPENDIX B

Table 14

The Ten 1976 U.S. Papers with Support Unacknowledged Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
1	212				2	19	46	93	52	COMPARATIVE ASPECTS OF GLYCOPROTEIN STRUCTURE. By: KORNFELD R ; KORNFELD S In: ANNU REV BIOCHEM 45:217-37, 1976 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: WASHINGTON U MED
2	179				1	18	38	60	62	125I-LABELED HUMAN EPIDERMAL GROWTH FACTOR.,BINDING, INTERNALIZATION, AND DEGRADATION IN HUMAN FIBROBLASTS. By: CARPENTER G ; COHEN S In: J CELL BIOL 71(1):159-71, OCT 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: VANDRBLT MED
3	164				8	40	41	44	31	POSSIBLE ROLE FOR CYCLIC NUCLEOTIDES AND PHOSPHORYLATED MEMBRANE PROTEINS IN POSTSYNAPTIC ACTIONS OF NEUROTRANSMITTERS. By: GREENGARD P In: NATURE 260(5547):101-8, 11 MAR 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: YALE U MED
4	163				1	30	47	50	35	MECHANISMS REGULATING RENIN RELEASE. By: DAVIS JO ; FREEMAN RH In: PHYSIOL REV 56(1):1-56, JAN 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U MO, COMB MED
5	144				19	40	36	30	19	ANALGESIA INDUCED IN VIVO BY CENTRAL ADMINISTRATION OF ENKEPHALIN IN RAT. By: BELLUZZI JD ; GRANT N ; GARSKY V ; SARANTAKIS D ; WISE CD ; STEIN L In: NATURE 260(5552):625-6, 15APR 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
6	109				2	25	24	33	25	THE ELECTROCHEMICAL GRADIENT OF PROTONS AND ITS RELATIONSHIP TO ACTIVE TRANSPORT IN ESCHERICHIA COLI MEMBRANE VESICLES. By: RAMOS S ; SCHULDINER S ; KABACK HR In: PROC NATL ACAD SCI USA 73(6):1892-6, JUN 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 14 (Continued)

The Ten 1976 U.S. Papers with Support Unacknowledged Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
7	103				12	20	22	31	18	MULTIPLE FORMS OF RAT LIVER CYTOCHROME P-450. IMMUNOCHEMICAL EVIDENCE WITH ANTIBODY AGAINST CYTOCHROME P-448. By: THOMAS PE ; LU AY ; RYAN D ; WEST SB ; KAWALEK J ; LEVIN W In: J BIOL CHEM 251(5):1385-91, 10 MAR 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
8	93				2	10	20	34	27	GLUTATHIONE AND RELATED GAMMA-GLUTAMYL COMPOUNDS: BIOSYNTHESIS AND UTILIZATION. By: MEISTER A ; TATE SS In: ANNU REV BIOCHEM 45:559-604, 1976 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: CORNELL MED, NYC
9	88				0	16	25	23	24	STEROID RECEPTORS: ELEMENTS FOR MODULATION OF EUKARYOTIC TRANSCRIPTION. By: YAMAMOTO KR ; ALBERTS BM In: ANNU REV BIOCHEM 45:721-46, 1976 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U CAL MED, S FRAN PRINCETON U
10	87				0	11	28	27	21	INVESTIGATION OF PHASE TRANSITIONS OF LIPIDS AND LIPID MIXTURES BY SENSITIVITY DIFFERENTIAL SCANNING CALORIMETRY. By: MABREY S ; STURTEVANT JM In: PROC NATL ACAD SCI USA 73(11):3862-6, NOV 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: YALE U, N HAVEN YALE U MED

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Table 15

The Ten 1977 U.S. Papers with Support Unacknowledged Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	228					12	49	80	87	STRUCTURE OF CHROMATIN. By: KORNBERG RD In: ANNU REV BIOCHEM 46:931-54, 1977 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: HARVARD MED
2	181					6	29	79	67	THE LOW-DENSITY LIPOPROTEIN PATHWAY AND ITS RELATION TO ATHEROSCLEROSIS. By: GOLDSTEIN JL ; BROWN MS In: ANNU REV BIOCHEM 46:897-930, 1977 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U TEX, COMB MED
3	133					1	27	49	56	RELATIONSHIPS BETWEEN CALCIUM AND CYCLIC NUCLEOTIDES IN CELL ACTIVATION. By: RASMUSSEN H ; GOODMAN DB In: PHYSIOL REV 57(3):421-509, JUL 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: YALE U MED
4	113					1	30	36	46	CYCLIC GMP METABOLISM AND INVOLVEMENT IN BIOLOGICAL REGULATION. By: GOLDBERG ND ; HADDOX MK In: ANNU REV BIOCHEM 46:823-96, 1977 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: U MINN, DULUTH, COMB MED
5	103					0	13	45	45	SIMULTANEOUS SINGLE ISOTOPE RADIOENZYMATIC ASSAY OF PLASMA NOREPINEPHRINE, EPINEPHRINE AND DOPAMINE. By: PEULER JD ; JOHNSON GA In: LIFE SCI 21(5):625-36, 1 SEP 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
5	103					1	32	35	35	EUKARYOTIC DNA POLYMERASES. By: WEISSBACH A In: ANNU REV BIOCHEM 46:25-47, 1977 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
7	101					2	14	58	27	LEGIONNAIRES' DISEASE: ISOLATION OF A BACTERIUM AND DEMONSTRATION OF ITS ROLE IN OTHER RESPIRATORY DISEASE. By: MCDADE JE ; SHEPARD CC ; FRASER DW ; TSAI TR ; REDUS MA ; DOWDLE WR In: N ENGL J MED 297(22):1197-203, 1 DEC 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: CTR DIS CNTROL

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*BID-SCI journal set citing BID-MEDLINE papers.

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Table 15 (Continued)

The Ten 1977 U.S. Papers with Support Unacknowledged Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
7	101					3	30	49	19	CYCLIC NUCLEOTIDES AND NERVOUS SYSTEM FUNCTION. By: NATHANSON JA In: PHYSIOL REV 57(2):157-256, APR 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: NIMH-ST. ELIZ
9	94					5	23	32	34	DESIGN OF SPECIFIC INHIBITORS OF ANGIOTENSIN-CONVERTING ENZYME: NEW CLASS OF ORALLY ACTIVE ANTIHYPERTENSIVE AGENTS. By: ONDETTI MA ; RUBIN B ; CUSHMAN DW In: SCIENCE 196(4288):441-4, 22 APR 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: UNIDENTIFIED
10	92					2	17	52	21	LEGIONNAIRES' DISEASE: DESCRIPTION OF AN EPIDEMIC OF PNEUMONIA. By: FRASER DW ; TSAI TR ; ORENSTEIN W ; PARKIN WE ; BEECHAM HJ SHARRAR RG ; HARRIS J ; MALLISON GF ; MARTIN SM ; MCDADE JE SHEPARD CC ; BRACHMAN PS In: N ENGL J MED 297(22):1189-97, 1 DEC 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: CTR DIS CNTROL

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Table 16

The Ten 1973 Papers with Foreign Authors or Coauthors
Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	509	1	18	43	88	92	92	106	69	EFFICIENT TRANSLATION OF TOBACCO MOSAIC VIRUS RNA AND RABBIT GLOBIN 9S RNA IN A CELL-FREE SYSTEM FROM COMMERCIAL WHEAT GERM. By: ROBERTS BE ; PATERSON BM In: PROC NATL ACAD SCI USA 70(8):2330-4, AUG 73 Support source(s): NATL SCIENCE FOUNDATION Corporate Address: FOREIGN
2	396	5	43	42	66	73	62	48	57	CELLULAR LOCALIZATION OF AN EPSTEIN-BARR VIRUS (EBV)-ASSOCIATED COMPLEMENT-FIXING ANTIGEN IN PRODUCER AND NON-PRODUCER LYMPHOBLASTOID CELL LINES. By: REEDMAN BM ; KLEIN G In: INT J CANCER 11(3):499-520, MAY 73 Support source(s): CANCER INSTITUTE Corporate Address: FOREIGN
3	351	0	1	17	27	43	66	98	99	THE LABELLING OF PROTEINS TO HIGH SPECIFIC RADIOACTIVITIES BY CONJUGATION TO A 125I-CONTAINING ACYLATING AGENT. By: BOLTON AE ; HUNTER WM In: BIOCHEM J 133(3):529-39, JUL 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
4	339	2	49	53	58	53	51	42	31	THE BIOCHEMISTRY OF PLANT LECTINS (PHYTOHEMAGGLUTININS). By: LIS H ; SHARON N In: ANNU REV BIOCHEM 42(0):541-74, 1973 Support source(s): LIBRARY OF MEDICINE NATL INSTITUTE OF HEALTH-GENL DEPT OF AGRICULTURE Corporate Address: FOREIGN
4	339	7	30	40	57	63	55	54	33	PURIFICATION AND FURTHER PROPERTIES OF SINGLE-STRAND-SPECIFIC NUCLEASE FROM ASPERGILLUS ORYZAE. By: VOGT VM In: EUR J BIOCHEM 33(1):192-200, 15 FEB 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
6	279	0	4	15	33	59	56	60	52	A RAPID, SENSITIVE, AND SPECIFIC METHOD FOR THE DETERMINATION OF PROTEIN IN DILUTE SOLUTION. By: SCHAFFNER W ; WEISSMANN C In: ANAL BIOCHEM 56(2):502-14, DEC 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 16 (Continued)

The Ten 1973 Papers with Foreign Authors or Coauthors Most Highly Cited in 1973-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
7	273	0	13	30	45	40	64	47	34	ALTERATION OF CELL-SURFACE PROTEINS BY VIRAL TRANSFORMATION AND BY PROTEOLYSIS. By: HYNES RO In: PROC NATL ACAD SCI USA 70(11):3170-4, NOV 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
8	261	2	8	33	48	71	40	32	27	CHROMATIN SUB-STRUCTURE. THE DIGESTION OF CHROMATIN DNA AT REGULARLY SPACED SITES BY A NUCLEAR DEOXYRIBONUCLEASE. By: HEWISH DR ; BURGOYNE LA In: BIOCHEM BIOPHYS RES COMMUN 52(2):504-10, 15 MAY 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
9	256	0	41	57	53	33	25	25	22	MEMBRANE STRUCTURE: SOME GENERAL PRINCIPLES. By: BRETSCHER MS In: SCIENCE 181(100):622-9, 17 AUG 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
10	215	0	15	23	39	39	34	28	37	ISOLATED REMOVAL OF HYPOTHALAMIC OR OTHER BRAIN NUCLEI OF THE RAT. By: PALKOVITS M In: BRAIN RES 59:449-50, 14 SEP 73 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN

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Table 17

The Ten 1974 Papers with Foreign Authors or Coauthors Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	1668		2	22	101	193	313	505	532	A FILM DETECTION METHOD FOR TRITIUM-LABELLED PROTEINS AND NUCLEIC ACIDS IN POLYACRYLAMIDE GELS. By: BONNER WM ; LASKEY RA In: EUR J BIOCHEM 46(1):83-8, 1 JUL 74 Support source(s): PRIVATE NON-PROFIT ARTHRITIS FOUNDATION Corporate Address: FOREIGN
2	370		8	57	77	96	62	46	24	CHROMATIN STRUCTURE: A REPEATING UNIT OF HISTONES AND DNA. By: KORNBERG RD In: SCIENCE 184(139):868-71, 24 MAY 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
3	277		9	36	53	64	49	39	27	ISOLATION AND STRUCTURE OF TWO PROSTAGLANDIN ENDOPEROXIDES THAT CAUSE PLATELET AGGREGATION. By: HAMBERG M ; SVENSSON J ; WAKABAYASHI T ; SAMUELSSON B In: PROC NATL ACAD SCI USA 71(?):345-9, FEB 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
4	276		0	35	65	77	42	34	23	SUBUNIT STRUCTURE OF CHROMATIN. By: NOLL M In: NATURE 251(5472):249-51, 20 SEP 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
5	265		1	16	38	44	42	66	58	PROSTAGLANDIN ENDOPEROXIDES. NOVEL TRANSFORMATIONS OF ARACHIDONIC ACID IN HUMAN PLATELETS. By: HAMBERG M ; SAMUELSSON B In: PROC NATL ACAD SCI USA 71(9):3400-4, SEP 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
6	243		2	22	33	36	39	59	52	NEW GIEMSA METHOD FOR THE DIFFERENTIAL STAINING OF SISTER CHROMATIDS. By: PERRY P ; WOLFF S In: NATURE 251(5471):156-8, 13 SEP 74 Support source(s): ATOMIC ENERGY COMMISSION(ERDA) Corporate Address: U CAL MED, S FRAN FOREIGN

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 17 (Continued)

The Ten 1974 Papers with Foreign Authors or Coauthors Most Highly Cited in 1974-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
7	228		6	45	55	62	21	27	12	CHROMATIN STRUCTURE; OLIGOMERS OF THE HISTONES. By: KORNBERG RD ; THOMAS JO In: SCIENCE 184(139):865-8, 24 MAY 74 Support source(s): PRIVATE NON-PROFIT Corporate Address: FOREIGN
8	216		3	15	22	37	41	54	44	THE DIRECT LINEAR PLOT. A NEW GRAPHICAL PROCEDURE FOR ESTIMATING ENZYME KINETIC PARAMETERS. By: EISENTHAL R ; CORNISH-BOWDEN A In: BIOCHEM J 139(3):715-20, JUN 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
9	202		5	19	21	45	37	35	40	THE 3'-TERMINAL SEQUENCE OF ESCHERICHIA COLI 16S RIBOSOMAL RNA: COMPLEMENTARITY TO NONSENSE TRIPLETS AND RIBOSOME BINDING SITES. By: SHINE J ; DALGARNO L In: PROC NATL ACAD SCI USA 71(4):1342-6, APR 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
10	183		1	8	31	30	39	42	32	DIFFERENCE IN MICROVISCOSITY INDUCED BY DIFFERENT CHOLESTEROL LEVELS IN THE SURFACE MEMBRANE LIPID LAYER OF NORMAL LYMPHOCYTES AND MALIGNANT LYMPHOMA CELLS. By: SHINITZKY M ; INBAR M In: J MOL BIOL 85(4):603-15, 5 JAN 74 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN

APPENDIX B

Table 18

The Ten 1975 Papers with Foreign Authors or Coauthors Most Highly Cited in 1975-80*

Rank	Total Cites Received	Cites received by citing year								
		73	74	75	76	77	78	79	80	
1	956			0	20	73	159	297	407	DETECTION OF SPECIFIC SEQUENCES AMONG DNA FRAGMENTS SEPARATED BY GEL ELECTROPHORESIS. By: SOUTHERN EM In: J MOL BIOL 98(3):503-17, 5 NOV 75 Support source(s): FOREIGN GOVERNMENT Corporate Address: FOREIGN
2	869			0	30	112	186	271	270	QUANTITATIVE FILM DETECTION OF 3H AND 14C IN POLYACRYLAMIDE GELS BY FLUOROGRAPHY. By: LASKEY RA ; MILLS AD In: EUR J BIOCHEM 56(2):335-41, 15 AUG 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF Corporate Address: FOREIGN
3	535			0	91	132	121	101	90	IDENTIFICATION OF TWO RELATED PENTAPEPTIDES FROM THE BRAIN WITH POTENT OPIATE AGONIST ACTIVITY. By: HUGHES J ; SMITH TW ; KOSTERLITZ HW ; FOTHERGILL LA ; MORGAN BA MORRIS HR In: NATURE 258(5536):577-80, 18 DEC 75 Support source(s): NATL INST DRUG ABUSE (NIDA) FOREIGN GOVERNMENT Corporate Address: FOREIGN
4	421			3	73	69	87	99	90	SOLUBILIZATION OF MEMBRANES BY DETERGENTS. By: HELENIUS A ; SIMONS K In: BIOCHIM BIOPHYS ACTA 415(1):29-79, 25 MAR 75 Support source(s): FOREIGN GOVERNMENT Corporate Address: FOREIGN
5	347			0	30	82	85	75	75	THROMBOXANES: A NEW GROUP OF BIOLOGICALLY ACTIVE COMPOUNDS DERIVED FROM PROSTAGLANDIN ENDOPEROXIDES. By: HAMBERG M ; SVENSSON J ; SAMUELSSON B In: PROC NATL ACAD SCI USA 72(8):2994-8, AUG 75 Support source(s): FOREIGN GOVERNMENT Corporate Address: FOREIGN
6	267			0	6	8	14	63	176	CONTINUOUS CULTURES OF FUSED CELLS SECRETING ANTIBODY OF PREDEFINED SPECIFICITY. By: K OHLER G ; MILSTEIN C In: NATURE 256(5517):495-7, 7 AUG 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 18 (Continued)

The Ten 1975 Papers with Foreign Authors or Coauthors Most Highly Cited in 1975-80*

Rank	Total Cites Received	73	74	75	76	77	78	79	80	
		Cites received by citing year								
7	237			0	43	64	49	47	34	FREEZE-ETCHING NOMENCLATURE. By: BRANTON D ; BULLIVANT S ; GILULA NB ; KARNOVSKY MJ ; MOOR H M UHLETHALER K ; NORTHCOTE DH ; PACKER L ; SATIR B ; SATIR P SPETH V ; STAEHLIN LA ; STEERE RL ; WEINSTEIN RS In: SCIENCE 190(4209):54-6, 3 OCT 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: HARVARD MED ROCKFLR U, NY FOREIGN
8	225			4	16	27	54	68	56	PLASMA-HIGH-DENSITY-LIPOPROTEIN CONCENTRATION AND DEVELOPMENT OF ISCHAEMIC HEART-DISEASE. By: MILLER GJ ; MILLER NE In: LANCET 1(7897):16-9, 4 JAN 75 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
9	224			14	51	53	43	32	31	ISOLATION OF AN ENDOGENOUS COMPOUND FROM THE BRAIN WITH PHARMACOLOGICAL PROPERTIES SIMILAR TO MORPHINE. By: HUGHES J In: BRAIN RES 88(2):295-308, 2 MAY 75 Support source(s): NATL INST MENTAL HEALTH FOREIGN GOVERNMENT Corporate Address: FOREIGN
10	207			4	30	33	30	53	57	INOSITOL PHOSPHOLIPIDS AND CELL SURFACE RECEPTOR FUNCTION. By: MICHELL RH In: BIOCHIM BIOPHYS ACTA 415(1):81-47, 25 MAR 75 Support source(s): FOREIGN GOVERNMENT Corporate Address: FOREIGN

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Table 19

The Ten 1976 Papers with Foreign Authors or Coauthors Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	499				0	40	100	169	190	AN EFFICIENT MRNA-DEPENDENT TRANSLATION SYSTEM FROM RETICULOCYTE LYSATES. By: PELHAM HR ; JACKSON RJ In: EUR J BIOCHEM 67(1):247-56, 1 AUG 76 Support source(s): FOREIGN GOVERNMENT Corporate Address: FOREIGN
2	289				0	49	89	77	74	AN ENZYME ISOLATED FROM ARTERIES TRANSFORMS PROSTAGLANDIN ENDOPEROXIDES TO AN UNSTABLE SUBSTANCE THAT INHIBITS PLATELET AGGREGATION. By: MONCADA S ; GRYGLEWSKI R ; BUNTING S ; VANE JR In: NATURE 263(5579):663-5, 21 OCT 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
3	227				21	67	49	52	38	IDENTIFICATION OF MUTAGENIC METABOLITES OF BENZO(A)PYRENE IN MAMMALIAN CELLS. By: HUBERMAN E ; SACHS L ; YANG SK ; GELBOIN V In: PROC NATL ACAD SCI USA 73(2):607-11, FEB 76 Support source(s): CANCER INSTITUTE Corporate Address: NIH FOREIGN
4	142				5	19	25	39	54	DETECTION OF IMMUNE COMPLEXES IN UNHEATED SERA BY MODIFIED 125I-CLQ BINDING TEST. EFFECT OF HEATING ON THE BINDING OF CLQ BY IMMUNE COMPLEXES AND APPLICATION OF THE TEST TO SYSTEMIC LUPUS ERYTHEMATOSU By: ZUBLER RH ; LANGE G ; LAMBERT PH ; MIESCHER PA In: J IMMUNOL 116(1):232-5, JAN 76 Support source(s): FOREIGN GOVERNMENT UN+SUPRANATIONAL ORGS Corporate Address: FOREIGN
5	137				0	24	41	44	28	THE RED CELL MEMBRANE. By: MARCHESI VT ; FURTHMAYR H ; TOMITA M In: ANNU REV BIOCHEM 45:667-98, 1976 Support source(s): GENERAL MEDICAL SCIENCES Corporate Address: YALE U MED FOREIGN

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 19 (Continued)

The Ten 1976 Papers with Foreign Authors or Coauthors Most Highly Cited in 1976-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	136				7	34	39	30	26	PROPERTIES OF THE ANTIGEN-SPECIFIC SUPPRESSIVE T-CELL FACTOR IN THE REGULATION OF ANTIBODY RESPONSE OF THE MOUSE. IV. SPECIAL SUBREGION ASSIGNMENT OF THE GENE(S) THAT CODES FOR THE SUPPRESSIVE T-CELL By: TADA T ; TANIGUCHI M ; DAVID CS In: J EXP MED 144(3):713-25, 1 SEP 76 Support source(s): FOREIGN GOVERNMENT AMERICAN CANCER SOCIETY Corporate Address: WASHINGTON U MED FOREIGN
6	136				0	11	32	47	46	SUBPOPULATIONS OF HUMAN T CELLS IDENTIFIED BY RECEPTORS FOR IMMUNOGLOBULINS AND MITOGEN RESPONSIVENESS. By: MORETTA L ; FERRARINI M ; MINGARI MC ; MORETTA A ; WEBB SR In: J IMMUNOL 117(6):2171-4, DEC 76 Support source(s): ALLERG & INFECT DISEASES CANCER INSTITUTE CHILD HEALTH & HUMAN DEV Corporate Address: U ALAB MED, BRMGH FOREIGN
8	131				5	25	39	33	29	MICROVISCOSITY PARAMETERS AND PROTEIN MOBILITY IN BIOLOGICAL MEMBRANES. By: SHINITZKY M ; INBAR M In: BIOCHIM BIOPHYS ACTA 433(1):133-49, 16 APR 76 Support source(s): FOREIGN GOVERNMENT Corporate Address: FOREIGN
9	121				2	32	24	33	30	SOLENOIDAL MODEL FOR SUPERSTRUCTURE IN CHROMATIN. By: FINCH JT ; KLUG A In: PROC NATL ACAD SCI USA 73(6):1897-901, JUN 76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
10	120				0	11	31	34	44	THE FUNCTION OF STEROLS IN MEMBRANES. By: DEMEL RA ; DE KRUYFF B In: BIOCHIM BIOPHYS ACTA 457(2):109-32, 26OCT76 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN

APPENDIX B

Table 20

The Ten 1977 Papers with Foreign Authors or Coauthors Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
1	283					37	108	76	62	NUCLIOTIDE SEQUENCE OF BACTERIOPHAGE PHI X174 DNA. By: SANGER F ; AIR GM ; BARRELL BG ; BROWN NL ; COULSON AR ; FIDDES CA HUTCHISON CA ; SLOCOMBE PM ; SMITH M In: NATURE 265(5596):687-95, 24 FEB 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
2	154					8	38	55	53	BENZODIAZEPINE RECEPTORS IN RAT BRAIN. By: SQUIRES RF ; BRASTRUP C In: NATURE 266(5604):732-4, 21 APR 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
3	148					3	25	47	73	ENDOGENOUS OPIOID PEPTIDES: MULTIPLE AGONISTS AND RECEPTORS. By: LORD JA ; WATERFIELD AA ; HUGHES J ; KOSTERLITZ HW In: NATURE 267(5611):495-9, 9 JUN 77 Support source(s): FOREIGN GOVERNMENT NATL INST DRUG ABUSE (NIDA) OTHER FEDERAL GOVERNMENT Corporate Address: FOREIGN
4	135					30	31	41	33	ACTION OF MICROCOCCAL NUCLEASE ON CHROMATIN AND THE LOCATION OF HISTONE H1. By: NOLL M ; KORNBERG RD In: J MOL BIOL 109(3):393-404, 25 JAN 77 Support source(s): FOREIGN GOVERNMENT Corporate Address: FOREIGN
5	123					9	29	59	26	CELL-FREE TRANSLATION OF SIMIAN VIRUS 40 EARLY MESSENGER RNA CODING FOR VIRAL T-ANTIGEN. By: PRIVES C ; GILBOA E ; REVEL M ; WINOCOUR E In: PROC NATL ACAD SCI USA 74(2):457-61, FEB 77 Support source(s): CANCER INSTITUTE Corporate Address: FOREIGN
6	118					6	36	44	32	STRUCTURE OF NUCLEOSOME CORE PARTICLES OF CHROMATIN. By: FINCH JT ; LUTTER LC ; RHODES D ; BROWN RS ; RUSHTON B ; LEVITT M KLUG A In: NATURE 269(5623):29-36, 1 SEP 77 Support source(s): NATL INSTITUTE OF HEALTH-GENL Corporate Address: FOREIGN

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*BID-SCI journal set citing BID-MEDLINE papers.

APPENDIX B

Table 20 (Continued)

The Ten 1977 Papers with Foreign Authors or Coauthors Most Highly Cited in 1977-80*

Rank	Total Cites Received	Cites received by citing year 73	74	75	76	77	78	79	80	
6	118					0	25	49	44	BENZODIAZEPINE RECEPTOR: DEMONSTRATION IN THE CENTRAL NERVOUS SYSTEM. By: M OHLER H ; OKADA T In: SCIENCE 198(4319):849-51, 25 NOV 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
8	110					0	18	45	47	DNA SEQUENCING WITH CHAIN-TERMINATING INHIBITORS. By: SANGER F ; NICKLEN S ; COULSON AR In: PROC NATL ACAD SCI USA 74(12):5463-7, DEC 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN
9	102					0	8	39	55	ANALYSIS OF SINGLE- AND DOUBLE-STRANDED NUCLEIC ACIDS ON POLYACRYLAMIDE AND AGAROSE GELS BY USING GLYOXAL AND ACRIDINE ORANGE. By: MCMASTER GK ; CARMICHAEL GG In: PROC NATL ACAD SCI USA 74(11):4835-8, NOV 77 Support source(s): NATL SCIENCE FOUNDATION PRIVATE NON-PROFIT Corporate Address: FOREIGN
10	98					0	16	32	50	ENHANCED AUTORADIOGRAPHIC DETECTION OF 32P AND 125I USING INTENSIFYING SCREENS AND HYPERSENSITIZED FILM. By: LASKEY RA ; MILLS AD In: FEBS LETT 82(2):314-6, 15 OCT 77 Support source(s): ALL UNACKNOWLEDGED/UNIDENTIF. Corporate Address: FOREIGN

APPENDIX C

LISTING OF THE BID-MEDLINE JOURNAL SET BY FIELD AND SUBFIELD (WITH LEVEL INDICATED)

FIELD [1]: CLINICAL MEDICINE

GENRL & INTERNAL MED

AM J MED	(L2)
AM J MED SC	(L2)
ANN INT MED	(L1)
ARCH IN MED	(L2)
BIOCHEM MED	(L3)
CLIN CHEM	(L3)
CLIN CHEM A	(L3)
CLIN SC MOL	(L3)
J AM MED A	(L1)
J CHRON DIS	(L1)
J CLIN INV	(L3)
J LA CL MED	(L3)
LANCET	(L2)
MEDICINE	(L2)
N ENG J MED	(L2)
P SOC EXP M	(L3)
SOUTH MED J	(L1)
YALE J BIOL	(L3)

ALLERGY

J ALLERG CL	(L2)

ANESTHESIOLOGY

ANESTH ANAL	(L2)
ANESTHESIOL	(L2)

CANCER

CANC CHEMOT	(L3)
CANCER	(L2)
CANCER RES	(L3)
INT J CANC	(L3)
J NAT CANC	(L3)
ONCOLOGY	(L2)

CARDIOVASCULAR SYSTM

AM HEART J	(L2)
AM J CARD	(L2)
*CHEST	(L1)
CIRCUL RES	(L3)
CIRCULATION	(L2)

DENTISTRY

AM J ORTHOD	(L2)
ARCH ORAL B	(L3)
J AM DENT A	(L1)
J DENT RES	(L3)
J PERIODONT	(L2)
ORAL SURG O	(L2)

DERMAT & VENERL DIS

ARCH DERMAT	(L2)
J INVES DER	(L3)

ENDOCRINOLOGY

DIABETES	(L3)
ENDOCRINOL	(L3)
GEN C ENDO	(L4)
J CLIN END	(L3)
J ENDOCR	(L3)
METABOLISM	(L3)
NEUROENDOCR	(L3)

FERTILITY

FERT STERIL	(L2)
J REPR FERT	(L3)

GASTROENTEROLOGY

DIG DIS SCI	(L2)
GASTROENTY	(L2)

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*Journal split, or subdivided, between two or more subfields.

xDenotes journal in original BID-SCI 275-journal set but not in the BID-MEDLINE 240-journal set, as a result of coverage changes.

APPENDIX C

LISTING OF THE BID-MEDLINE JOURNAL SET BY FIELD AND SUBFIELD (WITH LEVEL INDICATED)
(Continued)

FIELD [1]: CLINICAL MEDICINE (Continued)

GERIATRICS

GERIATRICS	(L1)
GERONTOL	(L1)
J AM GER SO	(L1)
J GERONTOL	(L2)

HEMATOLOGY

BLOOD	(L3)
BR J HAEM	(L3)
THROMB DIAT	(L3)
VOX SANGUIN	(L3)

IMMUNOLOGY

CLIN EXP IM	(L2)
IMMUNOLOGY	(L3)
J EXP MED	(L3)
J IMMUNOL	(L3)
J INFEC DIS	(L2)
J RETIC SOC	(L3)
MOL IMMUNOL	(L3)
TRANSPLAN P	(L3)
TRANSPLANT	(L3)

OBSTETRICS & GYNECOL

*AM J OBST G	(L2)
OBSTET GYN	(L1)

NEUROL & NEUROSURG

ARCH NE PSY	(L1)
BRAIN RES	(L4)
DEVELOP MED	(L2)
EEG CL NEUR	(L3)
EPILEPSIA	(L2)
EXP BRAIN R	(L4)
EXP NEUROL	(L4)
J COMP NEUR	(L4)
J NE EXP NE	(L3)
J NE NE PSY	(L2)
J NEUROCHEM	(L4)
J NEUROSURG	(L1)
J NEURPHYSL	(L4)
NEUROLOGY	(L2)
VISION RES	(L4)

OPHTHALMOLOGY

AM J OPHTH	(L2)
ARCH OPHTH	(L2)
EXP EYE RES	(L3)
INV OPHTH V	(L3)

ORTHOPEDICS

CLIN ORTHOP	(L2)
J BONE JOIN	(L1)

ARTHRITIS & RHEUMAT

ANN RHEUM D	(L2)
ARTH RHEUM	(L2)

OTORHINOLARYNGOLOGY

ANN OTOL RH	(L2)
ARCH OTOLAR	(L1)
J SPEECH HE	(L2)
LARYNGOSCOP	(L1)

PATHOLOGY

AM J CLIN P	(L2)
AM J PATH	(L3)
ARCH PATH	(L2)
EXP MOL PAT	(L3)
LAB INV	(L3)

PEDIATRICS

AM J DIS CH	(L2)
BIOL NEONAT	(L3)
J PEDIAT	(L2)
PEDIAT RES	(L3)
PEDIATRICS	(L2)

APPENDIX C

LISTING OF THE BID-MEDLINE JOURNAL SET BY FIELD AND SUBFIELD (WITH LEVEL INDICATED)

(Continued)

FIELD [1]: CLINICAL MEDICINE (Continued)

PHARMACOLOGY

BIOCH PHARM	(L3)
CLIN PHARM	(L2)
CURR THER R	(L1)
EUR J PHARM	(L3)
J CLIN PHAR	(L1)
J PHARM EXP	(L3)
MOLEC PHARM	(L3)
NEUROPHARM	(L3)
PHARM REV	(L3)
PSYCHOPHARM	(L3)
TOX APPL PH	(L3)

PHARMACY

J MED CHEM	(L3)
J PHARM SCI	(L3)

PSYCHIATRY

AM J ORTHOP	(L1)
AM J PSYCHI	(L1)
*ARCH NE PSY	(L1)
BR J PSYCHI	(L1)
xDIS NER SYS	(L1)
J NERV MENT	(L1)
J PSYCH RES	(L2)
PSYCHOS MED	(L2)

RADIOLOGY & NUCL MED

AM J ROENTG	(L1)
INV RADIOL	(L2)
J NUCL MED	(L2)
RADIAT RES	(L4)
RADIOLOGY	(L2)
SEM ROENTG	(L1)

RESPIRATORY SYSTEM

AM R RESP D	(L2)
*CHEST	(L1)
RESP PHYSL	(L4)

SURGERY

AM J SURG	(L1)
ANN SURG	(L1)
ARCH SURG	(L1)
J PED SURG	(L1)
J SURG RES	(L2)
J THOR SURG	(L1)
J TRAUMA	(L1)
PLAS R SURG	(L1)
SURG GYN OB	(L1)
SURGERY	(L1)
T AM S ART	(L1)

TROPICAL MEDICINE

AM J TROP M	(L2)

UROLOGY

INV UROL	(L2)
J UROL	(L1)

NEPHROLOGY

NEPHRON	(L2)

VETERINARY MEDICINE

AM J VET RE	(L3)
J AM VET ME	(L2)

HYGIENE & PUBL HLTH

AM J EPIDEM	(L2)
AM J PUB HE	(L1)
ARCH ENV HE	(L2)
B WHO	(L2)

APPENDIX C

LISTING OF THE BID-MEDLINE JOURNAL SET BY FIELD AND SUBFIELD (WITH LEVEL INDICATED)

(Continued)

FIELD [2]: BIOMEDICAL RESEARCH

PHYSIOLOGY

AM J PHYSL	(L4)
ANN R PHYSL	(L4)
J APP PHYSL	(L4)
J GEN PHYSL	(L4)
J PHYSL LON	(L4)
*LIFE SCI	(L4)
PHYSIOL REV	(L4)

ANATOMY & MORPHOLOGY

AM J ANAT	(L4)
ANAT REC	(L4)

EMBRYOLOGY

DEVELOP BIO	(L4)
TERATOLOGY	(L4)

GENETICS & HEREDITY

AM J HU GEN	(L3)
ANN HUM GEN	(L3)
BIOCHEM GEN	(L4)
CHROMOSOMA	(L4)
GENETICS	(L4)
MUTAT RES	(L4)

NUTRITION & DIETET

AM J CLIN N	(L4)
J NUTR	(L4)

BIOCHEM & MOLE BIOL

ANALYT BIOC	(L4)
ANN R BIOCH	(L4)
ARCH BIOCH	(L4)
BIOC BIOP A	(L4)
BIOC BIOP R	(L4)
BIOCHEM	(L4)
BIOCHEM J	(L4)
BIOPOLYMERS	(L4)
COLD S HARB	(L4)
EUR J BIOCH	(L4)
FEBS LETTER	(L4)
J BIOL CHEM	(L4)
J LIPID RES	(L4)
J MOL BIOL	(L4)
J THEOR BIO	(L4)
*LIFE SCI	(L4)
LIPIDS	(L4)
STEROIDS	(L4)

BIOPHYSICS

ANN R BIOPH	(L4)
BIOPHYS J	(L4)
J BIOMECHAN	(L4)

CELL BIOL CYT & HIST

ACT CYTOL	(L2)
CALCIF TISS	(L3)
EXP CELL RE	(L4)
J CELL BIOL	(L4)
J CELL PHYS	(L4)
J HIST CYTO	(L4)
J MEMBR BIO	(L4)
J ULTRA RES	(L4)
STAIN TECH	(L4)

MICROBIOLOGY

ANN R MICRO	(L4)
APPL MICROB	(L4)
J BACT	(L4)
J GEN MICRO	(L4)

APPENDIX C

LISTING OF THE BID-MEDLINE JOURNAL SET BY FIELD AND SUBFIELD (WITH LEVEL INDICATED)
(Continued)

FIELD [2]: BIOMEDICAL RESEARCH (Continued)

VIROLOGY

J GEN VIROL	(L4)
J VIROLOGY	(L4)
VIROLOGY	(L4)

PARASITOLOGY

EXP PARASIT	(L4)
J PARASITOL	(L4)
J PROTOZOOL	(L4)

BIOMEDICAL ENGINEERING

COMPUT BIOM	(L3)
IEEE BIOMED	(L3)

MISC BIOMEDICAL RES

HUMAN BIOL	(L3)
LAB ANIM SC	(L3)

GENRL BIOMEDICAL RES

*ANN NY ACAD	(L4)
*EXPERIENTIA	(L4)
*FED PROC	(L4)
*LIFE SCI	(L4)
*NATURE	(L4)
*P NAS US	(L4)
*SCIENCE	(L4)

APPENDIX C

LISTING OF THE BID-MEDLINE JOURNALS SET BY FIELD AND SUBFIELD (WITH LEVEL INDICATED) (Continued)

(BID-MEDLINE JOURNALS IN FIELDS OTHER THAN 1 and 2)

FIELD [3]: BIOLOGY

GENERAL BIOLOGY

*ANN NY ACAD	(L4)
*EXPERIENTIA	(L4)
*NATURE	(L4)
*P NAS US	(L4)
*SCIENCE	(L4)

GENERAL ZOOLOGY

xAM ZOOLOG	(L4)
J EXP ZOOL	(L4)

ENTOMOLOGY

J MED ENT	(L3)

MISCELLANEOUS ZOOL

COMP BIOCH	(L4)

BOTANY

xPHYTOCHEM	(L4)
xPLANT PHYSL	(L4)

AGRICULT & FOOD SCI

J AGR FOOD	(L3)

DAIRY & ANIMAL SCI

J ANIM SCI	(L3)
J DAIRY SCI	(L3)

MISCELLANEOUS BIOL

AM J P ANTH	(L4)

FIELD [4]: CHEMISTRY

ANALYTICAL CHEMISTRY

ANALYT CHEM	(L3)
J CHROMAT	(L3)

ORGANIC CHEMISTRY

CARBOHY RES	(L4)
*xJ CHEM S	(L4)
xJ HETERO CH	(L4)
xJ ORG CHEM	(L4)
xTETRAHEDR L	(L4)

INORGANIC & NUCL CHM

xINORG CHEM	(L4)
xJ CHEM S D	(L4)

GENERAL CHEMISTRY

*ANN NY ACAD	(L4)
*CHEM COMM	(L4)
*EXPERIENTIA	(L4)
xJ AM CHEM S	(L4)
*xJ CHEM S	(L4)
xJ CHEM S CH	(L4)
*NATURE	(L4)
*P NAS US	(L4)
*SCIENCE	(L4)

PHYSICAL CHEMISTRY

xACT CRYST	(L4)
*xJ CHEM S	(L4)
xJ PHYS CHEM	(L4)

APPENDIX C

LISTING OF THE BID-MEDLINE JOURNAL SET BY FIELD AND SUBFIELD (WITH LEVEL INDICATED)

(Continued)

FIELD [5]: PHYSICS

CHEMICAL PHYSICS

xJ CHEM PHYS (L4)
*xJ CHEM S (L4)

ACOUSTICS

xJ ACOUST SO (L3)

FIELD [8]: PSYCHOLOGY

CLINICAL PSYCHOLOGY

xJ ABN PSYCH (L1)

PERSONALITY & SOC PS

xJ PERS SOC (L1)

DEVEL & CHILD PSYCHO

xCHILD DEV (L2)
xJ EXP C PSY (L2)

EXPERIMENTAL PSYCHOL

J COM PHYSL (L4)
J EXP PSYCH (L4)
NEUROPSYCHO (L3)
xPERC MOT SK (L2)
xPERC PSYCH (L4)
PSYCHOPHYSL (L3)

GENERAL PSYCHOLOGY

xJ PSYCHOL (L1)
xPSYCHOL REP (L2)
*SCIENCE (L4)

MISC PSYCHOLOGY

AM J MENT D (L1)

BEHAVIORAL SCIENCE

xBEHAV RES M (L4)
xJ APPL BE A (L1)
J EXP AN BE (L3)
PHYSL BEHAV (L4)

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